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ARE ALL MEN EQUAL?

SPEAKING OF TIME —

The Ryerson Stock List and Steel Data Book is a great saver of time. Information about almost every type and kind of steel is included in its 224 pages.

If you do not have the 1934 Second Edition on your desk, let us know, and we will be pleased to see that you get your copy at once.

We have come to know that all men are not equal. There is a difference in heritage and there are other differences.

But in one respect, at least, there is absolute equality. Every man has the same amount of time at his disposal. The inequality, unfortunately, comes in the use of it. But time is such raw material—so difficult to make the most of.

In the case of purchasing, for instance, one may spend so much time in discussions, be continually following orders, contacting too many sources, checking too many invoices, and engaging in other time losing tasks—only to repeat the schedule month after month.

Under such a system time is completely consumed—there is no time for new work—no time to get ahead—no time to be of greater value to your firm.

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RYERSON STEEL SERVICE

As the Editor Views the News

RAYMOND MOLEY made a good point when he declared at the Congress of American Industry that "whatever tends to divide, tends to retard recovery, and whoever seeks, in the present instance, to promote ill feeling, is an enemy of this country and a destroyer of its prosperity." This is strong language, and, as it fell upon the ears of the hundreds of industrial executives at the Waldorf last Wednesday noon, one could not help wondering why he chose to utter it before that audience. No one ever heard the words "right" and "left" applied seriously to American political or economic thought until the brain trust was created.

• • •

Who Promoted Ill Feeling?

Nor has any recent development in American history been more provocative of ill feeling, of dividing the population into selfish factions, or of promoting the power of irresponsible, minority troublemakers than some of the early policies of the new deal. Industry, with its admitted mistakes, never has done anything so conducive to dividing the allegiance or sympathies of the public as did the brain trusters in the early days of the present administration. They, not industry, revived the feud between capital and labor. They stirred up feeling between the fortunate and unfortunate. Who was the intended target of the professor's barbed dart?

• • •

Talk to Your Congressman!

The National Association of Manufacturers deserves much credit for taking the initiative in promoting the Congress of American Industry. It was probably the most representative group of industrial executives (p. 14) assembled in recent years. The program was given wide publicity in the newspapers. As a result, the public during the past week has received more information as to industry's attitude on problems of recovery than at any time since the inauguration of the new deal. . . This is fine, but it does not go far enough. Many congressmen, reading the platform, will dismiss it as "window dressing." The way to make these doubting legislators realize that industry is sincere is for every industrial executive to insist that his congressman and senator listen attentively to a recital of his own problems, as they are affected by recovery policies.

• • •

The Human Factor in NRA

Engineers attending the fifty-fifth annual meeting of the American Society of Mechanical Engineers at New York last week were treated to an extensive program which reflected not only the progress of technology under the recent handicaps, but also demonstrated the keen interest of technical men in economic problems. It is interesting to note that appraisals of NRA, from the standpoint of the engineering mind (p. 52), do not differ much from those made by industrial executives. The engineers point to the element of human nature as a controlling factor in code administration—a consideration which is demanding more and more attention from the administrators of code authorities.

• • •

Business Is Looking Up!

As has been the case with many of this year's expositions, the eleventh annual power show (p. 54) demonstrated the increasing influence of special materials in the design of equipment. Applications of alloy steel were noteworthy. . . . In California a creamery company has adopted porcelain enameled steel bodies with stainless steel trim (p. 35) as standard for its trucks . . . interlocking sheet steel piling is used economically (p. 34) for a seawall to protect a Pacific coast highway. . . . The welding authority of a Pennsylvania builder of equipment contributes pertinent notes (p. 36) on the interesting problem of stress relieving. . . . Sharply advancing scrap prices (p. 77), the resumption of automobile production by two leading interests (p. 21) and an increase of two points in the steelworks operating rate (p. 18) indicate the pace of industrial activity is quickening.

E. L. Shaner

Industry, in a Co-operative Vein, Pens Recovery Platform

INDUSTRY made a supreme effort last week to further the rapprochement of government and business. More than 1300 executives of companies in practically every branch of industry assembled Wednesday and Thursday at the Waldorf-Astoria, New York, for the purpose of adopting a platform for recovery.

The event, appropriately called the "Congress of American Industry," was held under the auspices of the National Association of Manufacturers, and also constituted the thirty-ninth annual convention of that organization.

From the proceedings, it was clear that the representatives of industry assumed in a spirit of co-operation their task of drafting the planks of the recovery program. In the preamble to the proposed platform, offered to the congress for ratification, was industry's conception of the fundamentals in the road to recovery.

Reawaken Private Enterprise!

"Recovery," it was declared, "can be promoted by the re-employment of labor and capital in private enterprise—the only sure road to security, stability and progress. Recovery and employment must not be subordinated to reform. Build confidence by rigid adherence to sound policies."

The congress adopted the platform summarized elsewhere on this page and, in addition, authorized the appointment of a nation-wide committee to formulate a super program for prosperity upon which all business elements of the country may unite in co-operation with the government.

C. L. Bardol, president of the National Association of Manufacturers, was asked to name a committee to work with a similar committee of the United States chamber of commerce in formulating the program.

Leading this committee will be Robert L. Lund, former president of the association, and Silas H. Strawn, former president of the chamber.

It was the consensus of the meeting that the committee invite representatives from other business groups to constitute a larger committee in working out the super program.

Among the highlights of the congress was the appearance on the program of two official representatives of the government administration and one private individual who is closely associated with the President.

The latter, Prof. Raymond Moley, editor of *Today* and unofficial liaison officer between President Roosevelt and business and banking leaders, addressed the congress at luncheon on Wednesday. Speaking on "The Goal of Liberalism," he pleaded for a middle-of-the-road course between those "who would allow economic movement to have its way without restraint and those who would reconstruct industry immediately with social purposes exclusively."

Professor Moley devoted a large part of his address in an attempt to drive home to industry the assurance that President Roosevelt has been trying to save the capitalistic system and at no time has attempted to provide a substitute for it. He pointed out that there was no mandate in the national election of 1932 to seek a new system and declare "there is no workable and certain substitute for our present system." He said:

"As I see it, capitalism is a system which we have inherited. We were born under it and we live under it and it is ours to shape, strengthen or abolish if we wish. Under it American people have lived for a long time, and because of it or despite it certain definite gains have been registered."

Prof. Moley criticized the dividing of political thought into classes of the right and left. Declaring that whatever tends to divide tends to retard recovery, he assailed agitators and others who attempt to promote discord.

"Whoever seeks in the present instance to provoke ill feeling," he said, "is an enemy of this country and a destroyer of its prosperity."

Richberg Asks Support

The high point of the convention was the dinner, Wednesday evening, at which Donald R. Richberg, executive director of the National Emergency council, was the principal speaker. Introduced by James A. Emery, counsel of the National Association of Manufacturers, Mr. Richberg spoke on "Co-operation in Industrial Progress."

Taking his text from the statement in the platform submitted by the director of the National Association of Manufacturers, "No group of men is wise enough to plan and control the operations of all our manifold business activities," Mr. Richberg argued for the widest possible co-operation in the formulation and execution of plans for industrial recovery.

He referred to the recent meeting of the American Bankers' association and declared that it furnished a new inspiration to those who saw in the end of fault finding and in the beginning of a constructive co-operation between business and government the shortest, surest road of industrial progress.

"Those who try to attribute all of our ills in lack of confidence in the government are proving themselves

Industry's Platform

Stability in public finance is essential to stability of all credit,—public and private. Such stability cannot be achieved, recovery can not be attained by piling deficit on deficit and pyramiding new debts on old.

Savings and investments provide the tools for workers—they provide working capital and the basis of private credit necessary to keep workers and tools busy. To promote recovery, establish confidence in money and in our credit machinery —encourage savings and investment, and do not hamper their legitimate use.

Government should withdraw from all activities competing with those of its citizens. So long as the threat of such competition prevails, private industry will hesitate, recovery will be delayed.

Industrial strife stimulated by misinterpretation and misrepresentation of the respective rights and privileges of employes and employers, and the threat of arbitrary determination of wages and hours which ignore economic possibilities, prevent recovery. The federal government should not assume or attempt to control local relationships between employes and employers.

Distress caused by unemployment must be relieved, but relief must not be such that it will ultimately destroy the resources essential both for temporary relief and for re-employment Obtain security by measures which reduce rather than perpetuate or actually increase unemployment.

Any extension of the national recovery act should be of an emergency nature and administered by an independent administrative court of five members, possessing the authority to approve or disapprove codes of fair trade practice in interstate commerce that have been voluntarily submitted by a truly representative majority of a given group, trade or industry. The new act should require every code of fair competition to contain suitable provisions concerning hours and wages, prohibiting child labor, safeguarding both labor and employer by giving labor the right to deal with employers either individually or collectively or through representatives of their own free choice without intimidation from either party or from either source.

to be those in whom the government itself can have but little confidence," he said. "If there is to be co-operation in economic recovery it must come from those who have faith enough in their government and in themselves to stop complaining and put their shoulders to the wheel."

At this point in his argument Mr. Richberg referred to a statement of the directors of the association to the effect that commitments would be undertaken by industry only if business men believe that it will be safe and profitable to operate.

Mr. Richberg stated that this declaration caused his mind to slip back over the history of trade and commerce to stories of traders who dared the perils of the sea in light sailing vessels, who explored strange, dangerous lands; the adventurers who risked their lives and set forth to win wealth; etc.

Thrive on Risks

"I thought of the pioneers of America who blazed trails through the wilderness . . . built cities around new industries and spent their energies and their money in finding and developing the natural resources of the nation," he mused.

"And so with all due respect, I beg you disagree with any assertion that business stagnates except when it is safe and profitable to operate. On the contrary, I dare to assert that risk and adventure attract only the men who have any claim to greatness, of any right to leadership in any light of human endeavor.

"Unless the business men of America have been shell shocked into nervous impotence, there must come a time when they will respond to the fighting spirit of the old admiral who signaled 'Damn the torpedoes—go ahead.' "

Mr. Richberg spoke of the accomplishments of NRA, and admitted some of its short-comings. "The record of trade associations, upon which the recovery administration relied so hopefully in its infancy has been, to put it mildly, disappointing." He envisioned the continuance of a permanent though modified and simplified NRA.

Mr. Richberg emphasized the relation of private power and public responsibility.

"The increased freedom of business men and of workers to associate themselves for the advancement of their common interests," he said, "will impose upon them increased obligations to the public interest. The power of associated employers to control the livelihood of thousands of workers carries with it a responsibility for protecting and advancing their standard of living.

"In like manner the collective power of workers associated in labor organizations carries (at this point Mr. Richberg departed from his prepared text and instead of saying 'carries,' said 'should carry') a responsibility for the protection of the interests of those by whom they are employed."

At the Thursday noon luncheon, the principal speaker was Secretary of Commerce Daniel C. Roper who, like his predecessors on the program, urged industry not to fear the policies of the administration.

The secretary laid down a six-point program for recovery which included return of relief responsibilities to state and local governments as soon as possible; a sound public works program to provide projects of general utility without conflicting with private investment; a practical plan of unemployment returns without penalizing business progress; improvement of foreign markets; preservation of features of NRA which have proved workable and elimination of those which have not; and release and re-employment of capital by business as soon as possible for the purpose of stimulating recovery.

Secretary Roper's address may be summarized as essentially a plea to industry to throw away its "crutches of waiting and unfounded fears" and to co-operate wholeheartedly for recovery.

Ruled by Mob, Is Charge

The government today "is in fact in the hands of an organized mob and no matter how idealistic its leaders or representatives may be, it is impossible for unorganized industry to co-operate with a mob if recovery is to be on the basis of private enterprise," was the warning of Dr. Virgil Jordan, president, National Industrial Conference board.

Dr. Neil Carothers, director of the college of business administration, Lehigh university, declared:

In this country the conditions are set for recovery. Business has been chastened and purified in a hundred ways. The banks have been restored to soundness. Capital is piled high awaiting safe investment. Tremendous markets, domestic and international, are awaiting revival. Obsolete equipment is awaiting replacement. A starved consuming power is hungry to buy goods. The whole industrial equipment is set and ready to go.

And this blessed revival is blocked and hindered and retarded by uncertainty and fear, fear of what new experiment will next be tried, fear of some suicidal 30 hour week, fear of some government project for taking over the banks, fear of some spending policy that will destroy our solvency. We stand hesitating and shrinking on the very brink of recovery because governmental playboys continue to tinker with the vital economic processes of America.

Calls for End to Experiments

All that this country needs today is an end of experiment and manipulation and regimentation and interference. All that we need for recovery is an assurance that there will be no further attempts at recovery by law.

It is time now to let 130 million people pull themselves out of the mire. What the patient needs is a chance to recover. He cannot do this if he has to submit to a major operation every month. Let the government continue the relief work which it has, wisely or unwisely, undertaken for the nation. Let it announce that no further experiments will be tried. Let it announce that it will at the earliest possible moment balance its budget. Let it announce that it is going to give private business a chance. And this whole country will get up and go to work. Let the government give recovery a chance. That is all that it needs.

◆

DONALD RICHBERG: "Economic systems, with their good and evil, are wholly man-made. They are the product of human thought and energy. When one gets out of order only human beings can repair it; and they must work together, not separately, on that job"

◆

Basing Point

INTERPRETING the President's executive order of May 30, extending the steel code, to mean that a joint report should be submitted by NRA and the federal trade commission as a result of their study of iron and steel basing points and other code pricing methods, the national recovery board last week took the initiative for a joint report.

Through Donald R. Richberg, executive director of the President's national emergency council, it was expected that the White House would return the report already submitted by the trade commission and that the commission would be directed to confer with NRA, which was still withholding its report.

Based upon the trade commission's past dealings with the iron and steel industry, the presumption in Washington is that the commission's report is critical of the present basing point system, inasmuch as a few producing points are not also basing points. Since NRA approved the steel code it follows that it will uphold, in general, present pricing methods.

A reconciliation of the views of NRA and the trade commission appears to be a difficult matter, but both Mr. Richberg and S. Clay Williams, chairman of the recovery board, are attempting it.

In compiling the reports, it is understood that the trade commission and NRA exchanged information. The trade commission also drew upon the information unearthed in its investigation of the complaint of steel users in the Birmingham, Ala., district against the $3 differential over Pittsburgh charged by steelmakers at Birmingham.

The NRA report has been written by a committee consisting of Dr. J. M. Clark, Columbia university; Prof. N. P. Sharp, University of Chicago; B. T. Ansell, of the NRA legal division; and Deputy NRA Administrator R. W. Shannon. Chief Counsel Healey and Dr. G. A. Stephens and Hugh E. White, economists, wrote the trade commission report.

New Capacity

LEWIS FOUNDRY & MACHINE CO., Coraopolis, Pa., subsidiary of the Blaw-Knox Co., last week booked an order for a 68-inch 3-high rolling mill with tables, motors and controls for a Japanese steelmaker. The mill will have a capacity of 70 tons of No. 16 gage sheets per 8-hour shift. It will be delivered in March.

ADDS PIPE CAPACITY

Republic Steel Corp. is installing additional finishing equipment in its Youngstown, O., electric weld tube mills, and erecting a new building in which to house the equipment and provide additional storage space for the finished pipe, according to R. J. Wysor, vice president in charge of operations. The new equipment and building will cost about $500,000.

"The growing use of electric weld pipe has made necessary this increase in capacity," Mr. Wysor said. "In the last four and a half years Republic has sold over 9000 miles of electric weld pipe. Present outlook in the oil country indicates the probability of a still further increasing market for this product."

DENIES ORDERING STRIP MILL

Bethlehem Steel Corp., Bethlehem, Pa., last week denied a report that was gaining wide currency that it had ordered a wide continuous hot strip mill for its works at Lackawanna (Buffalo), N. Y. Bethlehem has long been rumored as a probable purchaser of such a mill for either Lackawanna or Sparrows Point (Baltimore), Md., and Pittsburgh equipment makers look for an active inquiry soon.

Labor

VIEWING the prospect of a truce between iron and steel producers and organized labor as growing dimmer, the national steel labor relations board last week took a step it regards as preliminary to ordering elections at the McDonald, O., and Duquesne, Pa., works of the Carnegie Steel Co.

In Washington, on Wednesday, the board took testimony calculated to confirm the interstate character of the business of the Carnegie company. Previously, testimony had been taken in regard to the strictly labor angle as precipitated by the Amalgamated Association of Iron, Steel and Tin Workers.

To make the record complete and its case air-tight, the steel labor board sought at Wednesday's hearing to get into the record evidence that the Carnegie company is engaged in interstate commerce. Representatives of the Amalgamated lodge testified that products of the company are shipped to other states.

L. H. Burnett, vice president of the Carnegie company, testified that although the products of the company were in some cases shipped to other states, employes were in no way connected with the handling of the company's products except within the confines of the plants in question.

A memorandum regarding the intrastate character of work done at the Duquesne plant, filed by the company, asserted that the controversy before the board "does not relate in any way to the general business of the company or in fact to the employes of the company generally but is confined solely and exclusively to the employes of a single plant."

The Carnegie situation has been dragging to the point where, if no truce is achieved, the board is in position where it must order an election for representatives for collective bargaining. The presumption is that the Carnegie company will seek an injunction and question the constitutionality of the labor act, in much the same fashion that the Firestone and Goodrich companies at Akron, O., are contesting in the courts the national labor relation board's order for an election.

Thus far, the steel board has ordered an election only in the case of the West Virginia Rail Co., Huntington, W. Va., which the Amalgamated won. Steel executives who have attended the board's hearings have gained the impression that members of the board are not too certain of their legal status.

Steel producers have been willing to treat with the Amalgamated to the extent of its membership, but have refused to accept the principle of majority rule, which the old labor board laid down in the Houde Engineering Corp. case. Through the Houde and the rubber manufacturers' suits, both the constitutionality of the labor relations act and of majority rule will be decided by the courts.

START AUTOMOBILE PROBE

Under the leadership of Leon Henderson, member of the new NRA recovery board, a special NRA board on Dec. 17 will open hearings in Detroit to study not only the labor angle of the automobile industry but also the capital structure, means for leveling of production and other pertinent matters as promised by the President in extending the automobile code with the merit clause retained.

¶Last Thursday the Cleveland Chain & Mfg. Co., Cleveland, cancelled its orders and closed indefinitely rather than submit to demands for wage increases of 33 to 40 per cent submitted by the blacksmiths and drop forgers union.

CARPENTERS WIN 15c RAISE

Within a stone's throw of the headquarters of Housing Administrator Moffett, who is attempting to stimulate housing and augment employment in the building trades union, carpenters employed on the new internal revenue building in Washington last Monday struck for an increase from $1.10 to $1.25 an hour, retroactive to Nov. 15. They won.

¶Cost of living of wage earners was off 0.1 per cent in November, according to the National Industrial Conference board. With 1932 equaling 100, the November index was 80.8, against 80.9 in October.

Financial

JOSEPH T. RYERSON & SON INC., Chicago, has declared a special dividend of 50 cents on its capital stock. President Edward L. Ryerson Jr. reports that total sales for 1934 will be at least 35 per cent ahead of 1933 and about 60 per cent larger than in 1932.

NATIONAL OPTIONS AT $40

National Steel Corp., Pittsburgh, is listing 46,000 additional common shares to be sold to a group of 17 officers and employes under a five-year option at $40 a share. This block is part of 100,000 shares set aside by the company's certificate of incorporation for this purpose.

¶A bondholders' committee representing defaulted gold notes purchased the Associated Simmons Hardware Co., controlling Simmons Hardware Co. and subsidiaries, of Missouri, at a foreclosure sale at St. Louis recently. Shapleigh Hardware Co., St. Louis, was the only other bidder at $2,250,000.

INTERLAKE BUYING ITS STOCK

Interlake Steamship Co., Cleveland, subsidiary of the Pickands, Mather & Co., and largest independent ore and coal carrying interest on the Great Lakes, is offering to buy from each stockholder 10 per cent of his Interlake stock at $30. For this purchase, some $1,600,000 accumulated for fleet modernization and new vessel construction will be employed. Interlake has declared a regular dividend of 25 cents a share, this being payable on Dec. 31 to record of Dec. 15.

MESTA ON $1.50 BASIS

Mesta Machine Co., Pittsburgh, has declared a quarterly dividend of 37½ cents on the common stock payable Jan. 1 to Dec. 17 record. Taking into consideration the recent stock dividend of 66 2/3 per cent, this places the stock on a $1.50 annual basis, equivalent to a $2.50 rate prior to the stock dividend.

MYERS RETIRING PREFERRED

F. E. Myers & Bro. Co., Ashland, O., on Dec. 31 will retire 5000 shares of 6 per cent preferred stock at 105 and accrued dividends. This cleans up a $3,000,000 issue floated in 1927. A 40-cent dividend on common stock and $1.50 on preferred has been voted by Myers.

¶International Nickel Co. of Canada Ltd. for the nine months ended Sept. 30 reports a net profit of $14,017,808 carried to surplus, compared with net of $5,636,019 in the same period of 1933. Earned surplus at the end of the first three quarters of 1934 was $30,190,545, against $19,098,616 one year previous.

¶Vulcan Detinning Co., Sewaren, N. J., has declared a special dividend of $4 a share on its outstanding common stock.

Meetings

IRON and steel executives of the South will be prominent in a joint meeting of southern agriculturists and industrialists at Birmingham, Ala., Dec. 18, looking to closer cooperation between these interests. Among speakers for the iron and steel industry will be Robert Gregg, president, Tennessee Coal, Iron & Railroad Co.; W. D. Moore, president, American Cast Iron Pipe Co.; and A. Hamilton, president, Alabama Pipe Co.

TO TALK ON STAINLESS

Dr. V. N. Krivobok, professor of metallurgy, Carnegie Institute of Technology, Pittsburgh, and associated with the research department of the Allegheny Steel Co., Brackenridge, Pa., will address the American Society for Metals on "Stainless Steels" at the Hotel Buffalo, Buffalo, Dec. 13. Prior to Dr. Krivobok's talk, scheduled for 8 p.m., a dinner will be held in his honor.

WILL INSPECT SMITH PLANT

Rock River Valley chapter of the American Society of Mechanical Engineers will devote its next meeting, on Jan. 17, to a visit of the plant of the A. O. Smith Corp. in Milwaukee, where a paper and discussion on welded engine frames will be heard and discussed.

Weirton Employes Voting as Suit Over 1933 Poll Drags On

A YEAR has passed since the Weirton Steel Co. strike made the front pages of practically every daily newspaper in the country.

For a week in early December, 1933, a fair cross section of that company's three mill towns just south of Pittsburgh was a scene of pickets, state troopers, and milling crowds amid an atmosphere laden with tear gas.

This coming week marks an anniversary of the company representation elections at Weirton, but with the edge off of strike developments the consensus of opinion is that little if any disturbance will mar the third Weirton employe representation election.

Weirton held its first employe representation election in June, 1933, but the mill employe voters agreed to hold a second election in the same year so as to make the results coincide with the calendar year, therefore the two 1933 elections. All other major steel companies with company employe representation plans hold their elections in June.

Today, Dec. 10, primary or nominating election is being held at the Clarksburg and Weirton, W. Va., divisions, as well as the Steubenville, O., works of Weirton. Forty-nine representatives for the 8000-odd Weirton Steel Co. employes will be elected from the list of nominees at a general election scheduled for Friday, Dec. 14. These 49 delegates are made up of 39 from the Weirton plant, 5 from Steubenville and 5 from Clarksburg. Of the 39 at Weirton, 12 are to be representatives of the steelworks, 11 from the tin mill, 11 from the strip mill and 5 from the sheet mill.

The Weirton employe representation plan's by-laws provide that only those employes with a 60-day record of employment prior to the election are entitled to vote although an amendment of a year ago provides that anybody can be elected as a representative whether an employe of the company or not, exclusive of the company's executive officers.

In 11 months of the Weirton employe representation plan, or from Jan. 1, 1934, through Nov. 15, the general committee of employe representation reported that decisions on 572 cases had been formally handed down. Of that number, 347 have been settled in favor of employes, 77 have been decided against employes, 24 have been withdrawn and 30 have been compromised.

This compares with the experience from June, 1933, to December, 1933, when in over 500 employe claims, 62 per cent were rendered in favor of employes, 10 per cent in favor of the management, and the remainder either dropped or compromised.

Meanwhile, the Weirton case in the federal court at Wilmington, Del., which incidentally arose out of the procedure of last December's election, is still hanging fire. Indications now are that a decision will not be rendered by the presiding judge until Feb. 1, 1935, at the earliest.

While the court sitting at Wilmington is reviewing testimony introduced so far, Dec. 14 has been established as the deadline for the government to file its brief of the case and the Weirton defense will file its brief by Dec. 29. On Jan. 5, the responding brief by the government will have been filed. Then, both sides will engage in oral argument beginning Jan. 14. After the latter, all active presentation of the case will be finished and an early decision awaited.

Production

STEEL production edged up 2 points last week to 30 per cent, reflecting increases in the Pittsburgh, Chicago, eastern Pennsylvania and Cleveland districts. Other districts dragged along unchanged. This is the highest level since the third week of July, when the rate also was 30 per cent. The prospect is that any change this week will be on the up rather than the down side. Details for various follow:

Youngstown—Averaged 35 per cent last week, unchanged from the previous week, although there were times during the week when the rate fluctuated to nearly 40 per cent. The rate is expected to advance to 39 per cent at this week's start, due to higher operations at the Ohio works of the Carnegie Steel Co.

Chicago—Rose fractionally to 34 per cent by the end of last week, following a decrease to below 33 per cent early in the week. Illinois Steel Co. has added a blast furnace, giving the district 9 active steelworks stacks out of 36. One merchant furnace also is in blast.

Birmingham—Maintained the 27½ per cent rate of the week previous and will probably hold at this level the better part of this month. The Ensley rail mill of the Tennessee Coal, Iron & Railroad Co. will be reopened starting this week for a week's run, to produce about 6000 tons of rail orders that have accumulated.

Wheeling—Up 16 points to 70 per cent last week, with 26 open-hearth furnaces now active in the district. A leading producer placed three more furnaces in operation; another mill added one, and a small producer, entering into the average, placed two small open-hearth furnaces on the active list.

Pittsburgh—Up 3 points to 23 per cent, last week, owing to the advances recorded by the independents in the district and despite the fact that a leading interest continues at around 19 to 20 per cent. One leading independent here, operating at almost 50 per cent of its individual capacity, is actively stocking ingots. Another independent mill, closed for some months, has reopened with two open-hearth furnaces. Further advances from the 23 per cent rate are looked for, which is the highest rate since last June.

However, only 12 steelworks blast furnaces are now on at Pittsburgh. Carnegie Steel Co. has blown out its G furnace at Edgar Thomson, leaving but 6 of 32 on for that interest. Of the remaining six furnaces on, Jones & Laughlin accounts for three, Bethlehem Steel Co., one at Johnstown, Pa., and both Pittsburgh Crucible Steel Co. and Pittsburgh Steel Co., one each. None of the American Steel & Wire Co. or National Tube Co. blast furnaces here is operating.

New England—Unchanged at 47 per cent last week, with steel works' schedules planned at the same rate this week.

Cleveland-Lorain — Advanced 2 points to 48 per cent, National Tube Co., Lorain, operating eight open hearths, Corrigan, McKinney Steel Co. seven, and Otis Steel Co. four. The National company has ten units scheduled this week.

Central eastern seaboard — Increased 2 points last week to 20½ per cent, with some producers drawing on ingot stocks to meet current finishing departments.

Buffalo—Held at 24 per cent last week, but this week the rate will be down 2 points to 22 per cent, due to one open hearth being taken off, making a total of eight active.

Detroit—Remained at 48 per cent last week, one producer scheduling seven open hearths and another two.

CANADIAN PRODUCTION GAINS

Production of iron and steel in Canada in October included: 46,573 tons of pig iron, compared with 43,019 tons in September and 27,002 tons in October, 1933; 2442 tons of ferroalloys, against 1147 tons in September and 9563 tons in October a year ago; 57,975 tons of steel ingots and castings, compared with 57,489 tons in September and 48,496 tons in October, 1933.

For the first ten months, pig iron production totaled 325,663 tons, about twice the total of 160,872 tons recorded for the same period last year. Ferroalloy production was practically unchanged, amounting to 20,666 tons, against 20,758 tons in first ten months of 1933. Steel ingots and castings totaled 643,137 tons, compared with 315,325 tons in the comparable period of 1933.

NRA

MESTA MACHINE CO., Pittsburgh, was granted permission last week to operate 48 hours a week, provided it paid its employes time and one-half for the extra eight hours, in order to expedite work on the continuous strip mill it is building for the Youngstown Sheet & Tube Co. A shortage of skilled mechanics was proved.

¶Domestic manganese producers are asking that hoist, power house and pump men be exempted from the 40-hour code and be permitted to work 48 hours a week.

TREAD INDUSTRY DEFINED

A proposed appendix to the code for the fabricated metal products manufacturing and metal finishing and metal coating industry offered by the Metal Safety Tread association defines the metal safety tread manufacturing subdivision as including the manufacture for the sale of metal safety tread containing either lead or abrasive to provide anti-slip quality; would provide for open-price filing, stipulating that members shall file with a confidential and disinterested agent identified lists of all their prices, discounts, rebates, allowances and all other terms or conditions of sale; would incorporate provision that when any member of the subdivision has filed any price revision, each member shall not file a higher price within 48 hours; holds intimidation, coercion and trade conspiracy as unfair competition, and would establish other trade practice provisions.

TRADE PRACTICE COMPLAINT COMMITTEE MEMBERSHIPS

Hand chain hoist manufacturing industry: D. S. Brisbin, Chisholm Moore Hoist Corp., Tonawanda, N. Y.; A. M. Harrington, the Har-

(*Please turn to Page* 81)

Foreign

ARRANGEMENTS are being completed by the Compania del Cerro de Mercado, a subsidiary of the Monterrey Iron & Steel Works, Mexico's largest enterprise of its kind, which was recently organized by a group of Mexican capitalists to exploit the Cerro de Mercado, "a large mountain of almost solid iron," near Durango City, for the establishment of a steel and iron plant at the foot of the mountain.

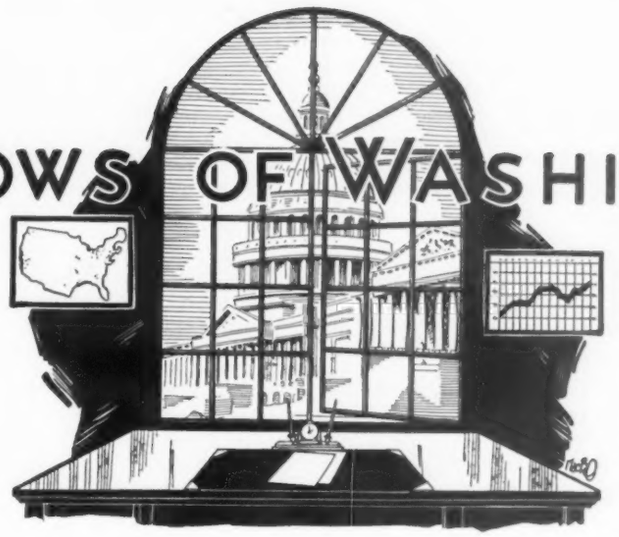
This plant will specialize in the production of structural material for buildings and bridges, and will cater to Mexican and Latin-American markets. About 3000 men will be employed.

WOODWORKING TOOL MARKET IN EUROPE EXPANDING

Returning from an investigation trip to Europe, Axle H. Oxholm, chief, forest products division of the bureau of foreign and domestic commerce, reports a growing market there for small machinery of the type used in the woodworking industries. Not only is there an increase in the number of small woodworking plants but there also is a trend toward mechanization. R. E. W. Harrison, chief, machinery and agricultural implements division of the bureau, is urging American manufacturers to contact their foreign representatives.

¶Australian Iron & Steel Ltd., whose plant at Port Kembla, New South Wales, was described in STEEL for June 4, 1934, page 21, will start work soon on its new 150-ton open-hearth furnace, its third open hearth, according to Assistant Trade Commissioner Flake, at Sydney.

WINDOWS OF WASHINGTON



WASHINGTON

NRA is dead! But—long live a new NRA more nearly conforming to the original concept of a framework within which business and industry, under government supervision, can regularize competition, grant labor reasonable wages and a voice, and operate at a fair profit. This is the cry in Washington today.

Unquestionably, the Johnson-blue eagle brand of NRA is through. The almost-deserted halls of NRA headquarters contrasted with the milling crowds of a year ago, the muted voice of its legal and compliance divisions, the standpat policy of the new recovery board, all manifest this.

It was never intended that the blue eagle should be more than a symbol for NRA, but on the diet of raw meat fed it by General Johnson it spread its wings to the point of obscuring the real intent. So, when the eagle was carried out of restaurants and small retail establishments where it could not reasonably perch, the public assumed that NRA also was dead.

TAKES NEW LEASE ON LIFE

That assumption, in fact, was almost enough to kill it. From early October, when General Johnson resigned, to about ten days ago, the trend line of NRA was precipitately downward; it was experiencing a depression of its own. Since then the feeling has greatly improved, and it now seems reasonably safe to forecast that not only will NRA be continued but also that it will remain a separate entity.

Of course, there will be a wild scramble in congress and almost anything can happen, but it also appears to be a conservative prediction that the ultimate form will be devised by the President, which in turn means by Donald R. Richberg, his No. 1 spokesman and ambassador to industry. A show of co-operation such as industry extended last week in New York (p. 14) conceivably may be of tremendous importance.

There are almost as many ideas in Washington concerning NRA as there are on social legislation. The radicals in congress can be relied upon to attempt to put more thumbscrews on industry. Organized labor will attempt to consolidate its gains in hours and wages—although publicly grousing that it has none—and will demand reinforcement for section 7a.

RETAIN BASIC PRINCIPLES

Secretary of Labor Perkins covets for her department the supervision of all labor provisions, and if organized labor were a little more assured of her practicality she would have its support. As the originator of trade practice conferences, the federal trade commission understandably casts an envious eye on the trade practice rules of codes. Also, the department of justice believes the regulation of pricing methods to come within its jurisdiction.

In the meantime, the recovery board headed by S. Clay Williams, tobacco magnate, is quietly making its own study. At this time it limits its foresight of the new NRA to the retention of limitation of hours, minimum wages and collective bargaining.

Secretary of Commerce Roper, member of the right wing of the administration, also regards these three points as the most important values to be retained, and at a recent press conference revived a phrase reminiscent of the first Roosevelt when he said "industry should be relieved of some of its hardships and it is advisable to enable 'good' business to operate in the interest of all society and not be handicapped by antitrust laws."

Also with a view of NRA's future, the recovery board is investigating labor exceptions to standard practice in all codes, proposing to standardize these and make them conform to whatever work-week is made basic.

THOSE with conservative views who have followed NRA from its inception are confident that, stripped of its blue eagle and the crackdown tactics of General Johnson, this new NRA will constitute a dignified set-up to which industry can readily subscribe.

Although stressing that NRA is now under board rather than personal control, Mr. Williams undoubtedly is the dominating personality. Incidentally, there is no blue eagle on the walls of his extremely modest office in the department of commerce building. When he departed, General Johnson took with him the enormous wicker eagle and the other trappings.

Second to Mr. Williams in point of leadership is W. Averill Harriman, chairman of the Union Pacific and Illinois Central railroad boards, who is attempting to rehabilitate NRA with the press. The onslaught of radical newspaper correspondents on both Messrs. Williams and Harriman is just so much evidence of their trend to the right.

DEPUTIES GO TO SCHOOL

Another indicator of the future is the new school that has been established for training executives in NRA. Heretofore, new deputies have followed an old deputy around for several days; now newcomers attend hearings, are lectured by present executives, and are schooled. At present there are 25 freshmen in the course. Incidentally, this plan was devised by Edward R. Stettinius Jr., vice chairman of the finance committee of the United States Steel Corp.

In its present mood, wishing to mark time until its future is more clearly defined, NRA is picking no quarrels and engaging in a minimum of court action. Practically all violations of codes are now being followed through by code authorities and, as

noted here several weeks ago, any refusal of a manufacturer to contribute to his code authority is a matter for the industry and not for NRA

This peace-at-any-price attitude is evidenced by its sidestepping the issue with Henry Ford. Although the executive order of the President forbids the government purchasing anything from a non-complier, the department of the interior a fortnight ago purchased a Ford car on the strength of the signature of a Washington distributor of Fords. Prodded severely on this matter, the attitude of NRA is that no official complaint concerning Ford is before it.

Since its inception a year ago June, NRA has occupied quarters in the new department of commerce building. Gradually it has encroached upon department of commerce divisions and forced some out of the structure which, at the beginning of the Roosevelt administration, was belittled as "Hoover's folly."

INDUSTRY DIVISION TO MOVE?

With Secretary Perkins about to move her department to its new home on Constitution avenue, NRA has an option on the old labor department building—a sizable 11 story structure. This, however, is only large enough to house the industry division, and the general administrative headquarters probably will remain in Secretary Roper's department.

It is little realized that NRA has virtually become a second congress. Codes are practically laws. Almost 5000 methods of business conduct are prohibited by codes which have the force of laws; the administrative law which is the outgrowth of the recovery act has resulted in about 3000 administrative orders and 700 direct executive orders, to say nothing of innumerable opinions from various code authorities and boards.

This "congress" is a changing body of almost 6000 persons. The bulk of the personnel in the legal department is under 30 years of age. Few deputies will discuss official business with representatives of code authorities without calling in "their attorney." The cost of code authorities and the upkeep of NRA headquarters is estimated at $10,000,000 a year.

THE suspicion that there are two Roosevelts—the one engaged in placating business because he realizes the stark necessity for it, the other ill at ease with business and businessmen—received further confirmation last week.

In New York, Professor Moley and Mr. Richberg, who constitute the flying squadron of the right wing, were persuading the council of businessmen rallied by the National Association of Manufacturers that the new deal was designed to save capitalism, urging industry to get behind a reorganized NRA and in general spreading assurance.

But at the "little White House" at Warm Springs, Ga., the wicker chairs forming a half circle before the cheery open fire were occupied by the blue-ribbon left wingers—Tugwell, Ickes, Hopkins, Morgan, Lilienthal, McNinch, Manly—practically all the left wing except Secretary of Labor Perkins.

Mr. Richberg, Secretary Roper and Housing Director Moffett provided the contacts for the right wing, but stayed only a fraction of the time that the left wing did.

Here, in the atmosphere of great congeniality which the President naturally radiates, the more important items of the administration's forthcoming legislative program were being discussed.

The news seeped out that the President after all might broaden the social phase of the program to include more than mere unemployment insurance.

On points, Secretary Ickes was winning the housing bout with Federal Housing Director Moffett, and it appeared that Mr. Ickes would handle slum clearance, Relief Director Hopkins subsistence homesteads, and Mr. Moffett only general housing.

During these conferences it became increasingly certain that the public works program to be proposed in January would top by a considerable margin the 3½ billions cited last week as the dividing point between a victory for the spenders or one for the right wing which would spur private initiative. The left wing appears to have sustained its contention that business cannot possible come back rapidly enough in the next few months to absorb any appreciable number of men now on relief rolls.

UNEASY AMID BUSINESS MEN

This assemblage of the left wing at Warm Springs was typical of the President's proclivities. He may feel the necessity for conciliating business and has delegated Professor Moley and Mr. Richberg to act as his apostles to carry the gospel to business, but for downright personal comfort the President's mind is much more at home with an Ickes than a Myron Taylor, and with a Hopkins than a Eugene Grace or a Tom Girdler.

But, despite this apparent victory by the left wing, steel and other durable materials seem certain to benefit from a much larger proportion of public works appropriation to be diverted to materials and equipment.

Mr. Ickes still thinks highly of the elimination of grade crossings. There will be a few millions, too, for the railroads if they care to have the government finance more rails and rolling stock.

This grade crossing elimination plan will appeal to every traveler until he learns that Mr. Ickes favors a tax on passenger tickets or freight bills or a levy on gasoline or a larger one on new automobiles to pay for the separations.

The low cost housing which Mr Ickes probably will sponsor will require more equipment in its construction on account of its mass character, and will develop demand for plumbing, piping, etc., more rapidly than Mr. Moffett's program, although the latter plan is more conservative.

A new subsidy for stimulating housing specifies a direct gift of 20 per cent of the cost of a project, the remaining 80 per cent to be loaned through the insurance guarantee method of the housing administration. For example, a man with a $500 lot wanting to build a $5000 house would be advanced $1000. From a lending agency, guaranteed by FHA, he could obtain a loan of $3600 or 80 per cent of the $5500 project. This would require a man to put up only $400 in cash in addition to the $500 he has in the lot. This is a trial balloon, sent up last week.

CALM BUDGETARY FEARS

In connection with the forthcoming budget, look for some bold and striking gesture. The fact that the government's borrowing of $900,000,000 this month will lift the public debt to another record high exceeding $28,500,000,000 will be treated in such a manner as to quell any apprehension.

Fears of inflation are creeping out again as a result of a trial balloon that the administration might seek from congress power to name the heads of the governors of the 12 federal reserve banks in order to prevent any possible obstruction to the government's financial program. The implication of this is that the government will be an increasingly heavy borrower, in turn foreshadowing larger public works appropriations and other expeditures.

In October, for which the civil service commission last week issued its report, the monthly payroll for the executive branch of the government reached $101,888,073—the first time it has passed the $100,000,000 mark. Civil servants of the government in October totaled 680,181, of whom 93,322 were in Washington and 586,859 in the field. Since Jan. 1 the government has added 88,000 employes.

A WEEK ago Friday W. B. Fry, purchasing agent for the department of the interior, wrote the names Bethlehem, Carnegie, Jones & Laughlin, Illinois and Inland on as many disks of paper, put the disks in a cardboard filing box, shook the box thoroughly, and drew out—Inland.

Thus did this Chicago district steel-

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DETROIT

THE first Fords of the 1935 series came off the assembly line last week. Operating five days, the Ford-son plant turned out a total of 2000 cars. Since motors have been in production for some time, assemblies are expected to be stepped up rapidly.

Plymouth, which week before last made 2000 of its new models, increased the rate slightly last week and this week is expected to augment its day line with one at night.

Chrysler, considering all divisions, assembled 6800 units last week, an increase of 3000, while General Motors at a total of 5100 for all divisions was made up about 1200.

The result was that last week's production for the industry as a whole almost doubled, coming close to 20,000 units. Last week's output was the highest for any week since that ended Oct. 27, and the first increase since the week of Oct. 20.

AHEAD OF LAST YEAR'S PACE

Compared with conditions a year ago, the industry is farther along on the road to relatively heavy operations. Pontiac, for instance, is 30 days ahead of last year from the standpoint of number of cars that will be ready for sale at the time of public announcement, while Hudson, free from delays encountered a year ago in tool and die work, is two months ahead of its schedule in late 1933.

While Chevrolet might be expected to be concerned over the fact that its principal competitors have the jump in the race for 1935 business, it can point to the fact that whereas during last December, January and February, Ford registered 72,978 passenger cars against 42,077 for Chevrolet, the latter went to the front in March with 50,796 against 46,200.

Furthermore, while Ford continued to lead in cumulative passenger car sales during the year, Chevrolet by October had overcome the former's earlier advantage in registrations of both cars and trucks and retains its title as leading producer.

Ford, on the other hand, can counter with the claim that of the three major manufacturers it showed the largest gain—around 75 per cent—in production this year over last. Chevrolet output for the model year 1934, now at an end, increased about 35 per cent over 1933, while Plymouth had a gain of about 25 per cent.

In the first ten months, production of independent companies rose more than 32 per cent, while for the entire industry the gain was 43 per cent. Ford's percentage of total production of the industry rose from 22 per cent to nearly 28 per cent this year compared with decreases from 42 to 39 per cent for General Motors, from 21 to less than 20 per cent for Chrysler and from 14.7 to 13.6 per cent for the independents.

Fundamentally the industry has good reason to look with favor on 1935 prospects. Sales of 1934 models recently have been well maintained, and the number of unsold cars in dealers' hands is now considered normal. October registrations were only 4.1 per cent less than in September and 3.5 per cent ahead of last year, and while November figures are not yet available, early reports indicate a satisfactory volume.

During the first 20 days of last month Chevrolet had the heaviest sales for that period since 1926 and Oldsmobile had a gain of 194.3 per cent over 1933. The manner in which demand recently has held up is regarded as a favorable sign for next year, assuming, of course, that new models will be a further stimulation to sales and that anticipated improvement in general business conditions during 1935 becomes an accomplished fact.

HIGH-PRICE LINES BENEFIT?

It is questionable whether the makers of medium and high-price cars or manufacturers in the lowest-price field stand to benefit most from a marked recovery in conditions. The former have suffered more than the latter in percentage drop in sales during the depression and would be expected to regain many of their former customers who deserted them for cheaper transportation should prosperity succeed in rounding the proverbial corner.

At the same time, numerous individuals who formerly were buyers in the economy class found themselves unable to buy new cars at all and remain as prospective purchasers once the depression lifts.

Just how much production will recover this month from November's low level is a matter of conjecture since difficulties encountered with

Automobile Production

Passenger Cars and Trucks—U. S. Only

By Department of Commerce

	1932	1933	1934
Jan.	119,344	128,825	156,907
Feb.	117,418	105,447	231,767
March	118,959	115,272	331,263
April	148,326	176,432	354,745
May	184,295	214,411	331,641
June	183,106	249,727	308,051
July	109,143	229,357	266,575
Aug.	90,325	232,855	234,809
Sept.	84,150	191,800	168,872
Oct.	48,702	134,683	132,448
Nov.	59,557	60,683	65,000*
Year to date	1,263,325	1,839,492	2,692,084

*Estimated.

Estimated by Cram's Reports

Week Ended	
Dec. 1	11,389
Dec. 8	19,347

initial assemblies of new models may cause necessary revisions of tentative schedules. November output for the United States and Canada was about 65,000 units, the smallest for the year to date, compared with 63,322 a year ago.

December last year brought an upturn to 84,376 and this figure is expected to be exceeded during the current month. Production of over 100,000 units is looked for, although realization of this or a higher goal depends largely on how rapidly the three major interests expand their operations. Since a number of manufacturers do not plan to announce their new models publicly until the first of the year and since some changes in design may be adopted after the shows, dealers will not be fully stocked until well into the first quarter.

Studebaker will show its new line Dec. 10 and indicates its view of 1935 price trends with advances of $30 to $75 on its two largest series. Dictator models are unchanged. Introduction of the new Ford is looked for around the middle of the month. Dealers last week saw the new Plymouth.

Nash will tell it to the public over a 100-station radio hookup during special programs Christmas and New Years afternoon, while presentations by other companies will be bunched around the latter part of December and early January. Chevrolet is not expected to be in volume production on the master series until late January or early February, but will have both master and standard models for show display.

STREAMLINING GIVEN O. K.

Within a few years the Ford car will have a rounded nose with engine mounted in the rear, if the company acts in accordance with views credited to Edsel Ford during a recent interview. Mr. Ford predicted that streamlined automobiles will be general within two years and that the trend probably will be toward the type just mentioned.

It will be recalled that one of the Briggs bodies displayed at the Ford expositions here and at A Century of Progress was built along such lines. While the 1935 Ford still is several steps removed from this design, the streamlining tendency is much more apparent than in present models.

A few trends also are more noticeable in preference for certain mechanical parts. Free-wheeling, a big talking point a few years ago, gradually has gone into the discard—Chrysler lines dropping it for 1935—while the automatic clutch also has lost favor as standard equipment. In their stead has come the overdrive transmission, offered by some Chrysler lines and adopted by several other cars on 1935 models.

Similar in results to Auburn's dual-ratio and to a certain extent to the fourth gear employed by some manufacturers in the past, the overdrive transmission automatically shifts to a higher gear on the lifting of the accelerator and effects a lower ratio of engine revolutions to car speed.

Hydraulic brakes have added new converts for next year, with the next move of General Motors in this respect awaited with considerable interest since Oldsmobile broke away from the mechanical-type group in 1934.

HOLD TO GEARSHIFT LEVERS

The tendency toward leverless shifting in the lower gear ratios is less pronounced. Reo recently has been the chief proponent of this mechanism and claims that the fact that other companies have not adopted similar equipment is due to Reo's holding the patents covering the best design. Hudson next year will feature a new gear shift minus the conventional lever, however.

Increased production of automotive parts, preparatory to actual assembly, is reflected in gradual improvement in employment here.

Toledo automotive plants also are increasing their forces. Chevrolet reopened its transmission plant there last week, with initial employment of 1500 to be expanded to around 2500 within a month. Willys-Overland has been adding 100 men daily, eventually to have 2000 workers in production of 15,000 cars authorized by the federal district court.

Shipments of Hupmobiles in November broke a five-year record for volume when a 50 per cent gain over October was registered. Despite these heavy shipments, the carryover of unfilled orders on Dec. 1 indicates that December will perhaps triple or quadruple last December.

Died:

COL. G. WATSON FRENCH, 76, associated for many years with industries in the Tri-Cities district and a prominent figure in the organization and early direction of the Republic Iron & Steel Co., predecessor to Republic Steel Corp., in Davenport, Iowa, Nov. 27.

He helped to organize the Bettendorf Metal Wheel Co. 46 years ago with the late William P. Bettendorf, and became president of the company, which had succeeded the Eagle Mfg. Co., manufacturer of farm implements, founded by Col. French's father. He was president of the Eagle company until 1896, and the next year, with his brother, the late Judge Nathaniel French, he formed the Sylvan Steel Co., of which he was president, and which built a rolling mill at Moline, Ill., to roll 25,000 tons of agricultural bars and shapes annually to be used in the Eagle company's own line of manufacture. In 1900 the Sylvan company was absorbed by Republic Iron & Steel Co. Col. French became a member of the board of directors and a member of the executive committee.

In 1909 backers of Republic, including Col. French, organized the Haselton Steel Tube Co. and a mill was built at Youngstown, O., to produce yearly 175,000 tons of tubing, casing and allied products. Eventually this mill was turned over to Republic. In 1909 the Bettendorf Metal Wheel Co. in Davenport was reorganized under the name of French & Hecht, Colonel French continuing as president until his death.

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David S. Stevenson, 71, sales manager for the Air Conditioning Corp., Chicago, in that city, Nov. 30.

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Walter C. Hunter, 33, East Chicago, Ind., head of the annealing department of the Inland Steel Co. plant at Indiana Harbor, Ind.

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Owen G. Evans, 38, metallurgist for the Youngstown Sheet & Tube Co., Indiana Harbor, Ind., in an accident near Schererville, Ind., recently.

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Henry C. Yauky, 78, one of the organizers of the Pan-American Bridge Co., Newcastle, Ind., and for years its secretary and treasurer, at his home near Hillsboro, Ind.

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J. D. Hollowell, 67, formerly Chicago manager for the De Laval Separator Co., in Indianapolis, Dec. 5. At one time he was identified with the Dole Refrigerating & Machine Co., Chicago, retiring from active business two years ago.

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G. F. Kriesel, inventor of a multipurpose drilling, milling and boring machine, in Minneapolis, Nov. 29. He also perfected the first voting machine for the Australian ballot system, and for many years was owner of the Mill City Mfg. Co.

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Fredolf J. Peterson, 49, Detroit district representative of the Electric Furnace Co., Salem, O., at his home in Detroit, Dec. 2, after a brief illness. Born in Sweden, he came to this country when 17, and had been associated with the Electric Furnace Co. for the past 15 years.

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Frank M. Eaton, 67, retired Cincinnati steel executive and brother of Joseph O. Eaton, chairman of the board of the Eaton Mfg. Co., Cleveland, at his home in Colorado Springs, Colo., Dec. 6. Previous to his retirement 18 years ago, Mr. Eaton was prominent in the steel industry in Birmingham, Ala., and Cincinnati, where he was connected with Hickman, Williams & Co. He moved to Colorado in 1905.

Industrial Men in the Day's News

J. E. TROYER has been named president of Central States Bridge & Structural Co., Indianapolis, succeeding the late Edward N. Messick. Mr. Troyer at one time was chief engineer and vice president of the company, but for the last 21 years has been associated with W. J. Holliday & Co., Indianapolis, in charge of the structural and reinforcing bar department.

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Frederick P. Nehrbas, vice president of Servel Inc., Evansville, Ind., has been appointed assistant to the president. W. E. Baker has been named works manager.

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Alexander Blackwood has been appointed general manager of the Dayton Steel Foundry Co., Dayton, O., to have direct charge of the manufacture and marketing of alloy steel castings, stainless and heat-resisting alloy castings. He received his technical education in Scotland and in Germany and was employed by steel foundries in these countries. Later he became general manager of the Acme Steel Co., Glasgow, coming to the United States in 1910 to become consulting metallurgist and manager of the Sauntry Process Co., New York. For eight years he was vice president of the Michigan Steel Casting Co., Detroit, for three years general manager of the Farrell-Cheek Foundry Co., Sandusky, O., and for a like period general manager of the Chicago Steel Foundry Co., Chicago.

Alexander Blackwood

□ □ □

Fowler McCormick, recently assistant manager of domestic sales for the International Harvester Co., Chicago, has been elected vice president in charge of foreign sales. He joined the manufacturing and engineering department of the company in 1925, remaining in that division until 1928, when he was transferred to the sales department. He served as branch manager at Grand Island, Nebr., and as sales manager for the northwest district until his appointment last year as assistant manager of domestic sales.

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Karl A. von den Steinen recently was appointed aluminum research fellow in the metals laboratory of the Carnegie Institute of Technology, Pittsburgh. This fellowship was established by the Aluminum Co. of America, Pittsburgh.

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Arthur E. Braun, president of the Farmer's Deposit National bank and Reliance Life Insurance Co., both of Pittsburgh, has been elected a director of the Allegheny Steel Co., Brackenridge, Pa., to fill the vacancy caused by the death of R. D. Campbell.

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George B. Vilas, recently general manager of the Chicago & North Western railroad, has been made vice president and general manager in charge of operations at Chicago. Chester F. Dike, formerly chief en-

Willis H. Carrier, Recipient of 1934 Medal, American Society of Mechanical Engineers

Father of the modern science of air conditioning, he has designed many basic devices in this field.

He is co-founder and chairman of a company well known for its developments in air conditioning.

He is past president of two technical societies, has received two other medals for his achievements.

WILLIS H. CARRIER, who last week was awarded the 1934 medal of the American Society of Mechanical Engineers "in recognition of his research and development work in air conditioning," is chairman of the Carrier Engineering Corp., Newark, N. J., a leading builder of air conditioning equipment.

Born in Angola, N. Y., he was graduated from Cornell university in 1901, and entered the employ of the Buffalo Forge Co., Buffalo, as research engineer. By 1906 he had become chief engineer. In 1915, with J. Irving Lyle and others, the Carrier Engineering Corp. was formed, with Mr. Carrier as president.

He developed the spray-type air washer upon which the entire modern science of air conditioning is said to rest basically. As air conditioning has grown and expanded, he has consistently contributed to its development. He had much to do with the present perfection of the centrifugal fan and the centrifugal pump.

He is a past president of both the American Society of Refrigerating Engineers and the American Society of Heating and Ventilating Engineers, and has been active with the A. S. M. E., contributing numerous papers and serving on several committees.

In 1931 he was awarded the John Scott medal of the city of Philadelphia, and in 1932 received the F. Paul Anderson gold medal of the heating and ventilating engineers' organization.

gineer, has been made vice president and chief engineer.

□ □ □

Charles Eveland has been named president and general manager of the newly reorganized Woodrow Washer Co., manufacturer of washing machines, which will be moved from Newton to Oskaloosa, Iowa, in January. Carl Bergman has been named vice president and general sales manager.

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Thomas A. Wright, secretary of Lucius Pitkin Inc., New York, and president of the Buffalo Testing Laboratories, Buffalo, recently was elected president of the Association of Consulting Chemists and Chemical Engineers.

□ □ □

F. L. Ebersole, formerly with Babcock & Wilcox Tube Co., Beaver Falls, Pa., recently was named master mechanic with the Kelly Axe & Tool Works, Charleston, W. Va., division of American Fork & Hoe Co., Cleveland.

□ □ □

J. Earl Jones, commercial manager of the Seattle Gas Co., Seattle, has resigned to become president of the P & C Hand Forged Tool Co., Portland, Oreg.

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Frank R. Valentine has been elected chairman of the board of M. D. Valentine & Bro. Co., firebrick and fireclays, Woodbridge, N. J. He has been active with the company for 43 years, the last 15 as president. Recently he underwent a serious operation and is now recuperating.

W. H. Peterson, formerly vice president, has been elected president and treasurer; M. D. McClain has been named vice president and will take charge of sales; and George E. Dix is secretary.

□ □ □

C. T. Ressler, formerly manager of railroad and marine sales for the Reading Iron Co., has been appointed specification engineer in the sales division, with headquarters at 401 North Broad street, Philadelphia.

R. I. Fretz, formerly district sales representative with headquarters in Columbus, O., has been named manager of eastern railroad and marine sales, with offices in Philadelphia. C. W. Guthrie, formerly salesman in New York, succeeds Mr. Fretz in the Columbus territory.

Bryant Myers has been named to the Reading Pacific coast sales force, with headquarters at 213 Sheldon building, San Francisco. E. S. Morrow has been appointed to the oil country sales force, with offices at Tulsa, Okla. F. B. Olcott will handle government business for Reading as special representative at 220 Mills building, Washington.

□ □ □

Charles Pack, recognized authority in the die castings field, has rejoined the Doehler Die Casting Co., Toledo, O., as assistant to the president in charge of all research and development. Since his last association with Doehler seven years ago he has been active in consulting work, in recent years with Pack-Morin Inc., New York.

□ □ □

A. J. Townsend, vice president and general manager of the Rotary Electric Steel Co., Detroit, who has been active chief executive officer of the company since its inception, has resigned the position of general manager; he will, however, continue to serve as vice president and a director. The condition of Mr. Townsend's health over the recent past has necessitated this action, and during the time required to fully recuperate, his activities with the company will be of an advisory and consulting nature.

November Ingot Output Up 12.9 Per Cent

PRODUCTION of steel ingots in November was the best for any month since June, according to the compilation of the American Iron and Steel institute. November, with a daily rate of production of 61,117 gross tons, compared with 54,146 gross tons for October, showed a gain of 6971 tons per day, 12.9 per cent, over the preceding month. Total production gained 121,117 gross tons. Per cent of operation in November was 27.76, compared with 24.59 in October.

Production for 11 months was 23,319,443 gross tons, compared with 20,795,473 gross tons for the same period in 1933 and 22,594,079 tons for all of 1933. On the 11 months period the increase was 12.1 per cent.

Steel Ingot Production—1933-34—97.82 Per Cent of the Industry Reporting

Gross Tons

1933	Open-Hearth	Bessemer	Monthly output companies reporting	Calculated monthly output all companies	No. of working days	Approx. daily output all companies	Per cent operation
Jan.	885,663	109,000	994,663	1,016,870	26	39,110	17.99
Feb.	992,798	126,781	1,049,579	1,073,012	24	44,709	20.57
Mar.	784,111	94,509	878,620	898,236	27	33,268	15.30
Apr.	1,180,823	135,217	1,316,040	1,345,422	25	53,817	24.76
May	1,176,425	216,841	1,933,266	1,976,428	27	73,201	33.68
June	2,211,652	296,765	2,508,417	2,564,420	26	98,632	45.37
July	2,743,326	355,836	3,099,162	3,168,354	25	126,734	58.30
Aug.	2,430,663	370,370	2,801,033	2,863,569	27	106,058	48.79
Sept.	1,991,204	242,014	2,233,218	2,283,079	26	87,811	40.40
Oct.	1,847,690	191,673	2,039,363	2,084,894	26	80,188	36.89
Nov.	1,331,029	156,939	1,487,968	1,521,189	26	58,507	26.92
11 mo.	18,045,384	2,295,945	20,341,329	20,795,473	285	72,967	33.57
Dec.	1,629,495	129,834	1,759,329	1,798,606	25	71,944	33.19
Total	19,674,879	2,425,779	22,100,658	22,594,079	310	72,884	33.53

1934

99.39 Per Cent of the Industry Reporting

Jan.	1,786,467	172,489	1,958,956	1,970,979	27	72,999	33.15
Feb.	1,993,638	175,873	2,169,511	2,182,826	24	90,951	41.31
Mar.	2,540,143	203,904	2,744,047	2,760,888	27	102,255	46.44
Apr.	2,622,372	257,482	2,879,854	2,897,529	25	115,901	52.64
May	3,000,624	331,620	3,332,244	3,352,695	27	124,174	56.39
June	2,714,983	282,592	2,997,575	3,015,972	26	115,999	52.68
July	1,343,732	119,869	1,463,601	1,472,584	25	58,903	26.75
Aug.	1,245,445	109,598	1,355,043	1,363,359	27	50,495	22.93
Sept.	1,126,415	117,580	1,243,995	1,251,630	25	50,065	22.74
Oct.	1,325,225	127,789	1,453,014	1,461,932	27	54,146	24.59
Nov.	1,447,297	132,059	1,579,356	1,589,049	26	61,117	27.76
11 mo.	21,146,341	2,030,855	23,177,196	23,319,443	286	81,537	37.03

Crucible and electric ingots not included. Percentages of operation for 1933 based on ingot capacity of 67,386,130 tons as of Dec. 31, 1932. Percentages for 1934 based on ingot capacity of 68,478,813 tons as of Dec. 31, 1933.

6-Point Program For Fabricators

AN AGGRESSIVE 6-point program for structural steel fabricators in 1935 was outlined by V. G. Iden, secretary of the American Institute of Steel Construction, in addressing a meeting of eastern fabricators at the Engineers' club in New York, Dec. 7.

Briefly, the Iden program is designed (1) to stabilize operating conditions; (2) to insure structural steel proper consideration in all public works; (3) to improve marketing conditions through proper presentation before the government, mills and trade organizations; (4) to standardize products and engineering practices; (5) to stimulate the interest of architects and engineers as well as builders through advertising and other promotion; and (6) to maintain

an organization which by co-operation with producers can more effectively extend markets for structural steel.

By increasing volume some of the most pressing evils of excessive competition will be relieved, Mr. Iden said.

Looking ahead he analyzed prospects, particularly in relation to possible developments in Washington. Concerning NRA he said "there is no denying the fact the code idea is undergoing a drastic overhauling by the President's advisers. The law and procedure will be completely rewritten, and probably our case then will be given more equitable consideration than during the first experimental two-year period under the NIRA."

Plan Enameling Campaign

Plans of the porcelain enameling industry for its education campaign in 1935 were discussed Nov. 16 at the second quarterly meeting of the educational bureau of the Porcelain Enamel institute in Columbus, O., Nov. 16.

The industry contact section of which Earle S. Smith, Toledo Porcelain Enamel Product Co. is chairman, contemplates department store demonstrations and programs for sales meetings, with a porcelain enamel week in "key" towns.

Phenomenal results from a small test campaign in the refrigeration field were reported by H. D. Chase, Chicago Vitreous Enamel Product Co., and chairman of the advertising and sales promotion section.

Denies Buying Reynolds Co.

The United States Steel Corp. Friday denied reports that it had acquired control of the Reynolds Spring Co., Jackson, Mich., which does a large automobile business.

NOVEMBER IRON PRODUCTION

	No. in blast last day of Nov.	No. in blast last day of Oct.	Total tonnage Merchant	Total tonnage Nonmerchant
Ohio	15	15	41,956	201,379
Penna.	18	21	37,289*	218,760*
Alabama	5	4	33,395	24,822
Illinois	4	4	29,965	47,598
New York	4	6	53,198	33,080
Colorado	1	1		
Indiana	5	5	441	148,552
Maryland	2	2		
Virginia	0	0		
Kentucky	1	1		
Mass.	0	0		
Tennessee	0	0		
Utah	1	1	871	86,600
West Va.	1	2		
Michigan	3	3		
Minnesota	0	0		
Missouri	0	0		
Total	60	65	197,115*	760,791*

*Includes ferro and spiegeleisen.

November Iron Output Gains 4 Per Cent; 5 Stacks Out

ALTHOUGH the increase in blast furnace operations in October was not sustained in November, production of coke pig iron during the latter month recorded a small increase. Active blast furnaces had risen to 65 in October after having stood at 61 in both August and September; in November the total dropped to 60.

AVERAGE DAILY PRODUCTION

	1934	1933	1932	1931
Jan.	39,537	18,348	31,336	55,337
Feb.	45,385	19,752	33,122	61,114
Mar.	52,438	17,484	31,194	65,448
Apr.	57,873	20,786	28,524	66,986
May	66,370	28,784	25,282	64,355
June	64,563	42,165	20,867	54,599
July	39,630	58,108	18,394	47,170
Aug.	34,199	59,137	17,035	41,264
Sept.	29,969	50,264	19,788	38,947
Oct.	30,689	43,824	20,795	37,831
Nov.	31,930	36,124	20,858	36,727
Dec.		38,456	17,650	31,625
Av.	44,759	36,223	23,699	50,035

Average daily output of coke iron in the United States in November was 31,930 gross tons, which, compared with the 30,689 tons of October, was a gain of 1241 tons, or 4.05 per cent. This was the best rate since August with 34,199 tons per day. The rate in September was 29,969 tons, and in November, 1933, 36,124 tons.

Total production of pig iron in November was 957,906 tons, this being an increase of 6553 tons, or 0.58 per cent, over the 951,353 tons of October. This increase was made in spite of the fact that November was a one-day shorter month than October. The November output was the best since August with 1,060,187 tons. Production in September was 899,075 tons; in November, 1933, it was 1,083,740 tons.

Pig iron produced in the United States in 11 months of the year has amounted to 14,949,673 tons, an increase of 2,920,102 tons, or 24.2 per cent, over the 12,029,571 tons made in the corresponding period of 1933. The 1934 production is the best since 1931 when the total was 17,282,634 tons. The 1932 figure was 8,126,888 tons.

Relating production to capacity, the rate of output for November was 22.8 per cent. This compares with 22.1 per cent in October, 21.5 per cent in September and 24.5 per cent in August, and 26.2 in November a year ago. Operations reached their peak in 1934 at 47.5 per cent in May.

Active blast furnaces on Nov. 30 totaled 60, as compared with 65 on Oct. 31 and 61 on Sept. 30. The highest number operating in any month in 1934 was 117 on May 31. During November, 1933, active units numbered 77. In the month just closed, 3 furnaces were blown in and 8 blown out or banked, the net loss being 5 furnaces. Of the steelworks or nonmerchant class, 3 were blown in and 7 blown out. Of the merchant class, none was blown in and 1 blown out. Potential blast furnaces in the country totaled 281 at the close of November.

MONTHLY IRON PRODUCTION

	1934	1933	1932
Jan.	1,225,643	568,785	971,437
Feb.	1,270,792	553,067	960,550
Mar.	1,625,588	542,013	967,015
Apr.	1,736,217	623,606	855,734
May	2,057,471	892,326	783,769
June	1,936,897	1,264,953	626,015
July	1,228,544	1,801,345	570,222
Aug.	1,060,187	1,833,265	528,105
Sept.	899,075	1,507,931	593,640
Oct.	951,353	1,358,540	644,648
Nov.	957,906	1,083,740	625,753
11 mo.	14,949,673	12,029,571	8,126,888
Dec.		1,192,136	547,179
Total		13,221,707	8,674,067

RATE OF OPERATIONS

(Relation of Production to Capacity)

	1934[1]	1933[2]	1932[3]	1931[4]
Jan.	28.3	13.3	22.1	38.4
Feb.	32.5	14.3	23.4	42.5
Mar.	37.5	12.7	22.0	45.4
Apr.	41.4	15.1	20.2	46.5
May	47.5	20.9	17.9	44.7
June	46.3	30.6	14.7	37.9
July	28.4	42.4	13.0	32.7
Aug.	24.5	42.8	12.0	28.7
Sept.	21.5	36.4	14.0	27.0
Oct.	22.1	31.8	14.7	26.3
Nov.	22.8	26.2	14.7	25.5
Dec.		27.9	12.5	22.0

[1]Based on capacity of 50,975,561 gross tons, Dec. 31, 1933; [2]on capacity of 50,313,975 tons, Dec. 31, 1932; [3]on capacity of 51,598,175 tons; [4]on capacity of 52,515,875 tons. Capacities by American Iron and Steel institute.

In Ohio: Haselton No. 5, Republic Steel Corp. In Pennsylvania: Cambria H, Bethlehem Steel Co.; National No. 1, National Tube Co.; Edgar Thomson G, Carnegie Steel Co. In New York: Lackawanna F, Bethlehem Steel Co.; Troy, Troy Furnace Corp. In Indiana: Gary No. 11, Illinois Steel Co. In West Virginia: Riverside, Wheeling Steel Corp.

Furnaces blown in during November were: In Ohio: Portsmouth, Wheeling Steel Corp. In Alabama: Fairfield No. 6, Tennessee Coal, Iron & Railroad Co. In Indiana: Gary No. 9, Illinois Steel Co.

EDITORIAL

Positions of Government and Industry Not Far Apart

LAST week's Congress of American Industry, held under the sponsorship of the National Association of Manufacturers provided an ideal setting for negotiating better accord between the government administration and the active management of industry.

Certainly the individuals participating in the event were truly representative of both interests. For industry, the more than 1300 chief executives in attendance, said to be acting in behalf of 70,000 companies, constituted one of the most impressive groups of industrialists that has been assembled in recent years. For the administration, Secretary of Commerce Daniel C. Roper, Executive Director Donald R. Richberg and Prof. Raymond Moley, unofficial adviser of President Roosevelt, constituted as authoritative a delegation as could be imagined, barring the presence of the President himself.

All three spokesmen for the government went to great pains to assure industry that it has nothing to fear from administration policies. Professor Moley chose to make this point by declaring that the objective of the new deal is to save capitalism rather than to develop a substitute for it. Mr. Richberg introduced the same thought by saying that the extraordinary acts of the government since March, 1933, are not the "consequence of an evil design to socialize private property and to stifle individual initiative" but were made necessary by the emergency. Secretary Roper's method of reassuring his audience of the soundness of administrative policy was to tack onto the six planks of his recovery platform soothing phrases such as "without conflicting with private investment and private industry," "without penalizing business progress," etc.

Roper, Richberg and Moley Urge Industry To Banish Fear and To Co-operate

Again, each using the same formula, the government spokesmen exhorted industrialists to banish fear and to co-operate whole-heartedly for recovery. Secretary Roper urged industry to throw away its "crutches of waiting and unfounded fears." Mr. Richberg asked industry to emulate the admiral who said, "Damn the torpedoes. Go ahead!" Professor Moley pleaded for industry to co-operate with government on a middle-of-the-road course.

To this barrage of reassurance, admonition and exhortation, industry responded by adopting at platform of industrial co-operation for recovery and by authorizing the appointment of a joint committee representing as broadly as possible all elements of business to formulate a super-program upon which all factions could unite with the government for recovery.

The platform which was adopted by the congress represents a tremendous task in which scores of collaborators attempted to reconcile the views of all types of industrialists. The platform unquestionably is one of the best that can be devised under the present system of industrial organization.

As for the spirit behind the pledges by industry, it probably was expressed accurately by Counsel Emery at the conclusion of Mr. Richberg's address: ". . . . This group is determined to give every co-operation to the government that the government will give to it, in making operative the natural forces of recovery."

Industrial Pledges Co-operation and Adopts Platform for Promoting Sound Recovery

Reduced to the fewest words, the government's suggestion to industry seems to be, "Banish fear; go ahead," and industry's attitude appears to be "we're doing the best we can under the circumstances. Give us more assurance that your intentions are sound, and automatically our opportunities for 'going ahead' will be broadened."

These two positions are not as far apart as they seem. The gulf between them is largely that of misunderstanding.

Imagine that Mr. Richberg, Secretary Roper or Professor Moley were to change places with the president of a typical industrial company. Isn't it likely that after acquainting himself with the facts, the new president would find himself ruled by the same caution which governed the acts of his predecessor? Would not his newly acquired obligations to employes and stockholders compel him to "go slow" before "throwing away his crutches?"

Likewise, would not the industrial executive, hastily precipitated into Mr. Richberg's job, find that it is not as easy to give sincere "assurances" as it is to ask for them? But after investigating the problem thoroughly, would he not decide that there *is* one assurance that can be vouchsafed safely?

That assurance is that the intent of the government is to curtail expenditures at the earliest possible moment. It is the most important key to co-operation, which will lead to recovery.

Business Men's PROSPERITY SURVEY

HERE'S a chance to give voice to your own ideas as to which national policies you believe most likely to speed recovery in your line of business.

BALLOTS like this are being published this month in many business papers affiliated with The Associated Business Papers, Inc.—reaching virtually all key men in every line of industry, trade and profession throughout the nation.

BUSINESS men, nationally, may appreciate an opportunity to express their convictions to a strictly non-partisan and impartial body—with the assurance that by so doing, business views will be presented effectively to the political, banking, industrial, business and labor leaders of the country.

QUESTIONS on the economic ballot below are prefaced with "In your line of business" to make possible an industry by industry study as well as a consensus of business opinion in all fields of industry—so let our industry be well represented in the responses.

ECONOMIC BALLOT

Check your convictions, sign, clip and mail this ballot.

1. As regards the possibility of Congress adopting a universal thirty-hour work week, do you favor such legislation? Yes ( ) No ( ); and if so on the basis of ( ) continuation of existing weekly wages, or ( ) continuation of existing hourly rates of pay.

2. In your line of business are you satisfied with enforcement of maximum hours and minimum wage provisions now in effect? Yes ( ) No ( )

3. In your line of business is there obtainable ample **working** capital—from banks? Yes ( ) No ( ); from government agencies? Yes ( ) No ( )

4. In your line of business is there obtainable ample **investment** capital—from banks? Yes ( ) No ( ); from government agencies? Yes ( ) No ( )

5. In your line of business do you favor limitation of industrial output—by government control? Yes ( ) No ( ); by industry control? Yes ( ) No ( )

6. In your line of business do you favor a plan for control of prices—by a code provision establishing price fixing? Yes ( ) No ( ); by a code provision establishing an open price plan? Yes ( ) No ( )

7. In your line of business do you think that government measures now in effect are **helping** small and medium sized enterprises? Yes ( ) No ( ); hurting such enterprises? Yes ( ) No ( )

Signed .....

Firm .....

Business .....

Please return this ballot to
The Associated Business Papers, Inc.
330 West 42nd St.,
New York, N. Y.

THE BUSINESS TREND

More Gains in Sight Before Year-end Holidays

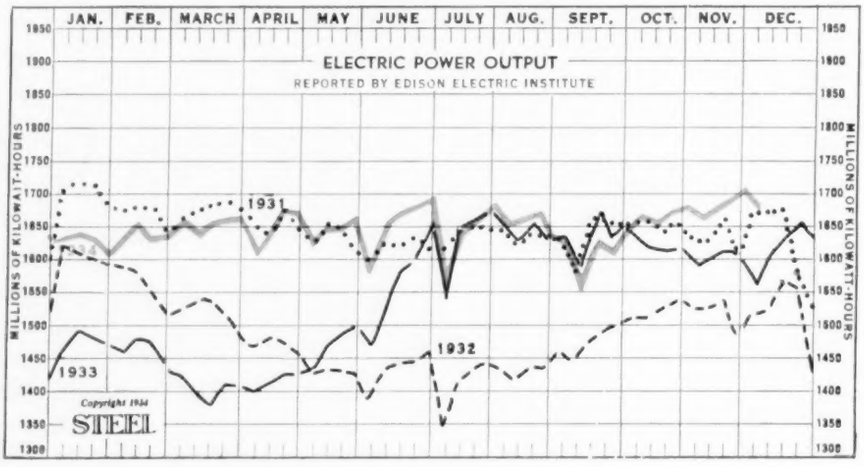
OUTPUT of steel ingots and pig iron in November was slightly above October totals, this being the second consecutive month in which a gain was registered.

By a coincidence, the rate of steelworks operations during November paralleled closely the rates for November in 1933 and 1931. In 1931, the rate declined in December and remained at a low level throughout the following year. In 1933, it climbed steadily in December until the holidays, slumped over the year-end and then ascended to a peak in June, 1934.

Today the outlook seems to favor a repetition of the 1933-34 trend rather than that of 1931-32. With revenue car loadings tapering off less sharply than the seasonal recession, electric power output being maintained at high levels, steel operations gaining slowly and automobile assemblies on the verge of a spurt, the prospect of a pre-holiday improvement in industrial activity is promising.

1934

Million Kw.--Hr.	
Dec. 1	1,683
Nov. 24	1,705
Nov. 17	1,691
Nov. 10	1,675
Nov. 3	1,669
Oct. 27	1,677



1933

Million Kw.--Hr.	
Dec. 2	1,553
Nov. 25	1,607
Nov. 18	1,617
Nov. 11	1,616
Nov. 4	1,583
Oct. 28	1,621

TO READERS OF STEEL:

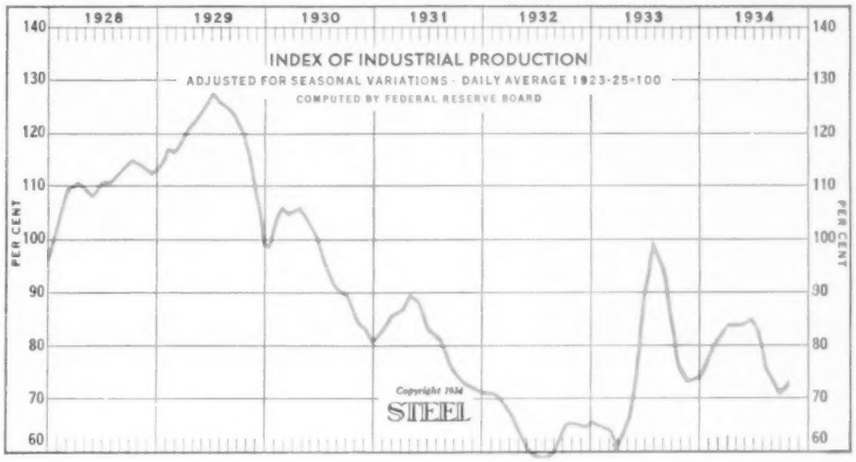
The ballot printed on the reverse side of this page is being published in leading business papers affiliated with The Associated Business Papers, Inc., to afford key men in every line of industry, trade and profession an opportunity to voice their opinions as to which national policies they believe are most likely to stimulate recovery.

The editors of STEEL *present this ballot with the hope that many of its readers will avail themselves of this chance to participate in a nation-wide census of the opinion of business executives.*

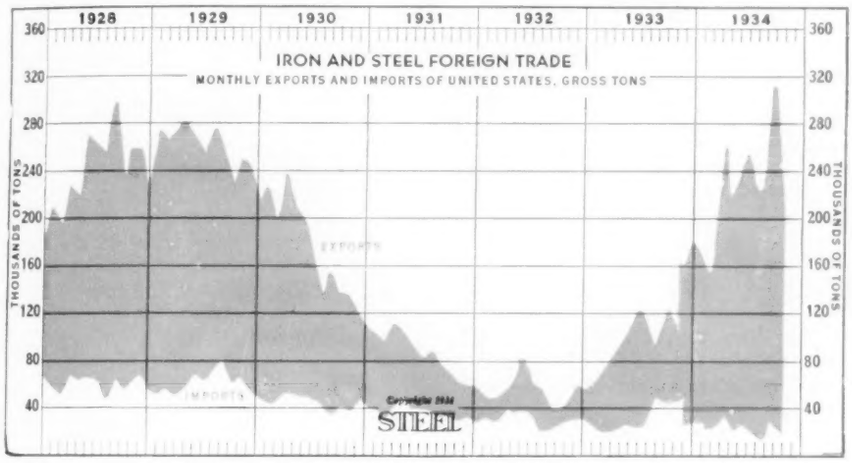
—THE EDITORS

Industrial Production Index Points Upward in October

The index of industrial production advanced to 73 in October, according to the monthly report issued by the federal reserve board. This is the first upward movement the index has registered since April when it advanced one point to 86. The index in October 1933 was 77. The production index for manufacturers was 72 against 69 in September and 76 in October last year. The index for steel was up 4 points to 41 and compares with 60 in the like period of 1933.



October, 1934	73
September, 1934	71
October, 1933	77



Exports	Tons
October, 1934	220,209
September, 1934	301,330
October, 1933	164,755

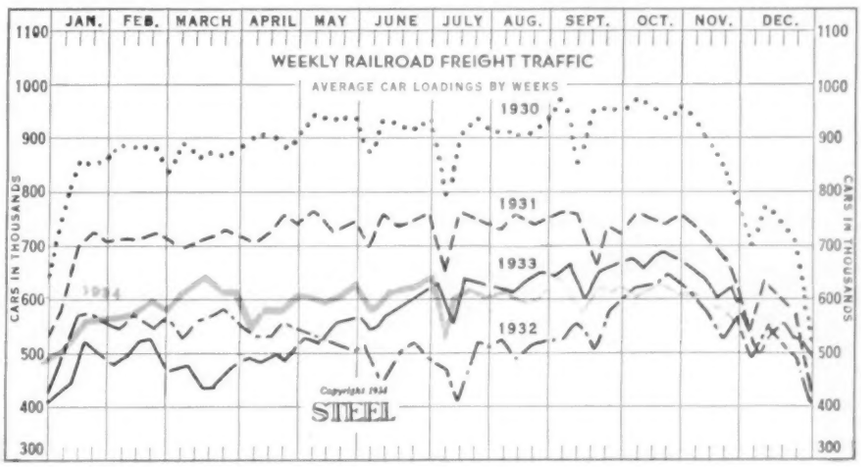
Imports	Tons
October, 1934	20,202
September, 1934	23,847
October, 1933	46,673

October Steel Exports Down As Scrap Shipments Slump

Exports of iron and steel products in October totaled 220,209 gross tons, a decline of 81,121 tons from the 301,330 tons shipped in September, according to statistics compiled by the department of commerce. This decline in exports was caused almost entirely by the shrinkage of scrap shipments declined 77,999 tons from 225,212 tons in September to 147,213 tons in October. Imports at 20,202 tons registered a drop of 15.2 per cent from the 23,847 tons imported in September and compares with 46,873 tons received in October, 1933.

Freight Traffic Reduced; Below 1933 Level

Loadings of revenue freight in the week ended Nov. 24 totaled 561,313 cars, according to the weekly report of the Association of American Railroads. This was a decrease of 23,212 below the previous week, 24,425 cars less than were loaded in the comparable week of 1933 and 67,995 cars more than were moved in the like week of 1932. The decrease in the week ended Nov. 24 from the preceding seven days amounted to 4 per cent, a less than seasonal decline.



	1934	1933
November 24	561,313	585,738
November 17	584,525	602,708
November 10	594,932	583,073

Factors Influencing Creep of Steels at Elevated Temperatures

BY A. E. WHITE, C. L. CLARK and R. L. WILSON

This is the second of two articles dealing with properties of steels in high-temperature service; the first appeared in STEEL for Nov. 26. Authors A. E. White and C. L. Clark are director of engineering research and research engineer, respectively, at the University of Michigan, Ann Arbor, Mich.; R. L. Wilson is metallurgical engineer, Timken Steel & Tube Co., Canton, O.

RESEARCH and designing engineers interested in the subject of creep often have had occasion to express concern over the apparent lack of agreement in test results obtained from different laboratories on steels of approximately the same chemical composition. Owing to the complexity of the subject, information is not available concerning all the possible variables and, in fact, probably all the variables are not as yet even known. Those to be considered in the present discussion are: Chemical composition, heat treatment, grain size, temperature of recrystallization and test procedure.

Chemical Composition

Until recently the belief was held by many that all the low-alloy steels of the pearlitic type possessed the same creep characteristics, especially at temperatures of 800 to 1100 degrees Fahr.; and further, if superior creep-resisting characteristics were required, it was necessary to resort to highly-alloyed austenitic steels, such as the 18-8 chrome-nickel type, or the ferritic chromium steels of the 18 per cent chromium type.

Almost everyone now will agree that a wide range of creep characteristics may be obtained at temperatures up to 1100 or 1200 degrees Fahr. with pearlitic steels, depending on their composition. The desired operating temperature determines the most suitable composition. For temperatures below the lowest temperature of recrystallization the creep resistance may be increased by the addition of elements which largely enter into solid solution with the ferrite, such as nickel and manganese, as well as by the addition of carbide-forming elements, such as chromium, tungsten, molybdenum and vanadium. The carbides of these elements are located within the crystals as well as at the grain boundaries and exert a keying action along the crystallographic planes which decreases the tendency to creep.

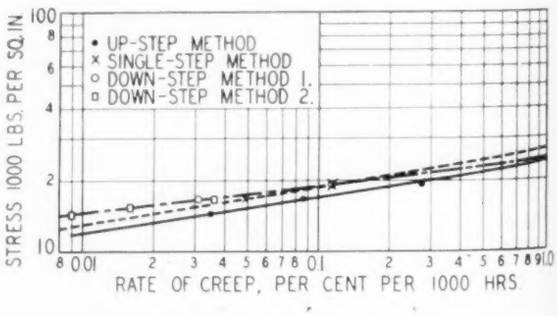
At temperatures above the lowest temperature of recrystallization, the elements most effective in increasing the creep resistance of pearlitic-type steels are those forming carbides. Certain alloying elements may also improve the creep resistance at a given temperature by increasing the lowest temperature of recrystallization. Since creep and the lowest temperature of recrystallization, or equicohesive temperature, appear to be closely connected, any element which increases this temperature will also increase the creep resistance at temperatures above it.

Creep Stresses Compared

The creep characteristics of several pearlitic alloy steels at temperatures of 800 to 1200 degrees Fahr. are given in Table I (p. 32). Creep characteristics are expressed in terms of the stresses required for creep rates of 1 per cent per 100,000 hours, 1 per cent per 10,000 hours and 1 per cent per 1000 hours. They indicate that the steels possessing the highest creep strength, especially at 1000 and 1200 degrees Fahr., are those containing carbide-forming elements. The differences between the steels at 1200 degrees Fahr. are not as marked as at 800 or 1000 degrees Fahr., but are significant even at the higher temperature. For example, on the basis of 1 per cent creep per 10,000 hours, type DM steel is nearly four times as resistant to creep at 1200 degrees Fahr. as MM9 steel and over one and one-half times as strong as the 4-6 per cent chromium-0.50 molybdenum steel.

In any type-series of pearlitic alloy steels, slight variations in composition have been found to influence the creep strength greatly. This is illustrated in Table II by the creep characteristics at 900 degrees Fahr. of a group of manganese-molybdenum steels differing principally in manganese content. The amount of this element varied from 1 to 3 per cent.

The highest properties are shown by the alloy containing 1.25 per cent manganese and the lowest by the one containing 2.99 per cent. In other words, the maximum creep resistance for any given series of steels is not necessarily exhibited by the alloy


STRESS 1000 LBS. PER SQ. IN
100
8
6
4
2
10
• UP-STEP METHOD
× SINGLE-STEP METHOD
○ DOWN-STEP METHOD 1.
□ DOWN-STEP METHOD 2.
8 0.01 2 3 4 5 6 7 8 0.1 2 3 4 5 6 7 8 9 1.0
RATE OF CREEP, PER CENT PER 1000 HRS.

1. ORIGINAL LOAD MAINTAINED CONSTANT FOR AT LEAST 600 HOURS
2. ORIGINAL LOAD MAINTAINED CONSTANT FOR ONLY 24 HOURS.

FIG. 1—Influence of method of loading on the creep characteristics of grade B steel at 850 degrees Fahr.

containing the greatest amount of alloy addition. In fact, available information indicates that in order to obtain the maximum creep resistance, a specific amount of the particular element must be present.

Heat Treatment

Heat treatment is recognized widely as having an important effect on the creep of the pearlitic steels, especially in the temperature range up to 1000-1100 degrees Fahr. Many laboratories anneal all specimens to be used in creep tests on the assumption that service conditions will ultimately reduce the constituents of the steel to the form in which they will be found after the material has been annealed. In work done at the University of Michigan, some creep tests have been made on steels that have been normalized and tempered at 1200 degrees Fahr. This treatment has been found to produce better creep resistance than is obtained for the same steels in either the annealed or the quenched and tempered condition, and the resulting structure is considered sufficiently stable for operating temperatures up to 1000 degrees Fahr.

Data are given in Table III to show the influence of various treatments on creep. The material was a killed carbon steel containing 0.15 per cent carbon.

The heat treatment designated 1015D leaves the steel spheroidized; in the other three conditions of structure the carbon-rich grains consist of lamellar or sorbitic pearlite. The structures obtained are revealed in the photomicrographs of Fig. 2. From the tabulated creep strengths it is apparent that the spheroidizing treatment produces the lowest creep resistance, although there is not much difference between the effect of the spheroidizing and the annealing treatment for the slower rates of creep. The normalizing and tempering treatment (short-time reheating) confers greater resistance to creep than the annealing treatment. The hot-rolled steel exhibits high creep strength, probably due to favorable carbide-particle size and dispersion, but the advantage can be regarded as only temporary for the structure is the most unstable of those examined.

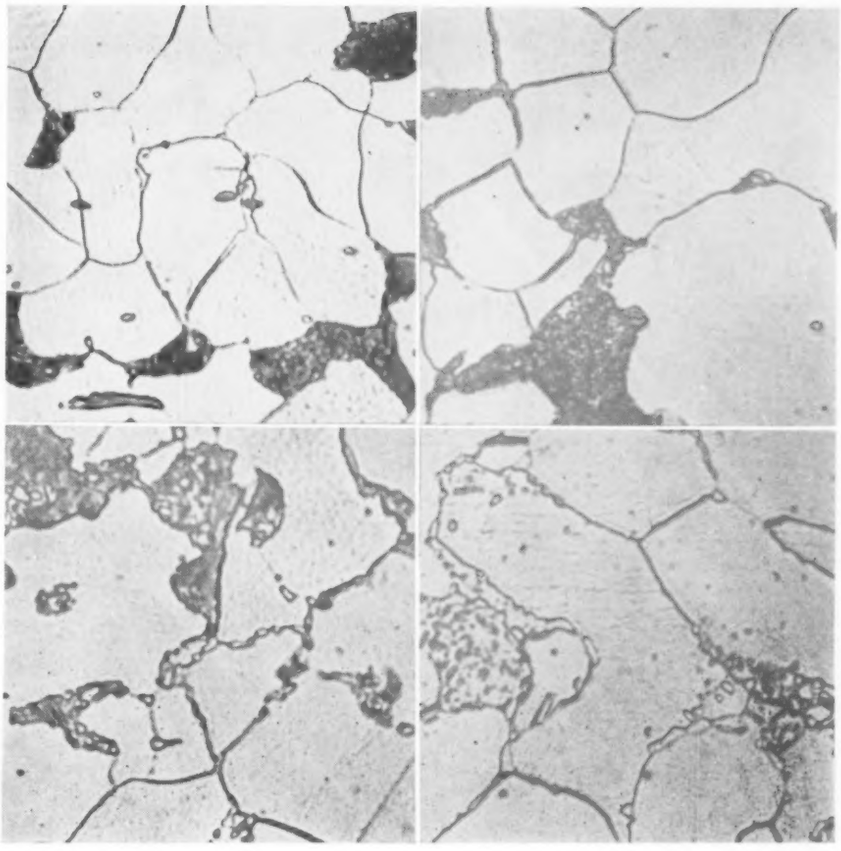


Fig. 2—Microstructures produced in a 0.15 per cent carbon steel by four different heat treatments. Upper left is the steel hot rolled; upper right normalized at 1725 degrees Fahr. and tempered at 1300 degrees Fahr. for one hour; lower left annealed at 1650; and lower right normalized at 1725 and tempered at 1200 for 168 hours. X1000

The data also indicate there is a difference in the degree of stability of the steel in the spheroidized state, undoubtedly depending upon the agglomeration of the carbides. The normalized steel tempered one hour at 1200 degrees Fahr. is similar to the spheroidized material except that the carbide particles are smaller. Protracted heating at the same temperature has resulted mainly in the increase of particle size until the condition has been reached that is described as a spheroidized structure.

The redistribution and growth of the carbide particles in any structure is aided by the greater solubility and faster diffusion of the carbon at high temperatures. Obviously, the creep characteristics of a steel will vary as spheroidization proceeds, even during creep testing. For practical purposes steels are considered as being stabilized after a full-softening anneal.

Grain Size

It is known that the size of the crystals comprising the structure of the steels influences the creep characteristics. There are two aspects of the effect of crystal size or "grain size" upon the behavior of steels. It is necessary to consider not only the actual grain size of the structure independent of the previous circumstances but also the "inherent grain size," which is established by means of a standardized carburizing treatment.

Inherent grain size is a misnomer that cannot be displaced easily because the term is already in common use. The grain size numbers really measure the rate of grain growth of steels at 1700 degrees Fahr. Each steel has only one rating for inherent grain size but may present a large number of structural grain size

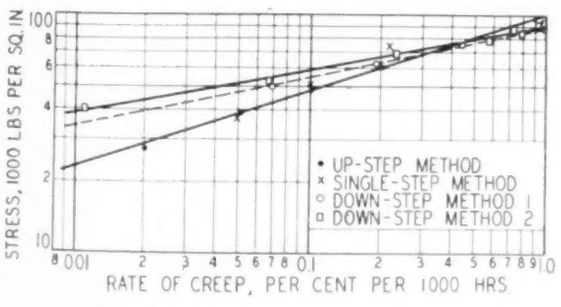

STRESS, 1000 LBS PER SQ. IN
100
8
6
4
2
10
• UP-STEP METHOD
× SINGLE-STEP METHOD
○ DOWN-STEP METHOD 1
□ DOWN-STEP METHOD 2
8 0.001 2 3 4 5 6 7 8 0.1 2 3 4 5 6 7 8 9 1.0
RATE OF CREEP, PER CENT PER 1000 HRS.
1. ORIGINAL LOAD MAINTAINED CONSTANT FOR AT LEAST 600 HOURS.
2. ORIGINAL LOAD MAINTAINED CONSTANT FOR ONLY 24 HOURS.

FIG. 3—Influence of method of loading on the creep characteristics of grade B steel at 1000 degrees Fahr.

Table I

Creep Characteristics of Several Pearlitic Steels at Elevated Temperatures

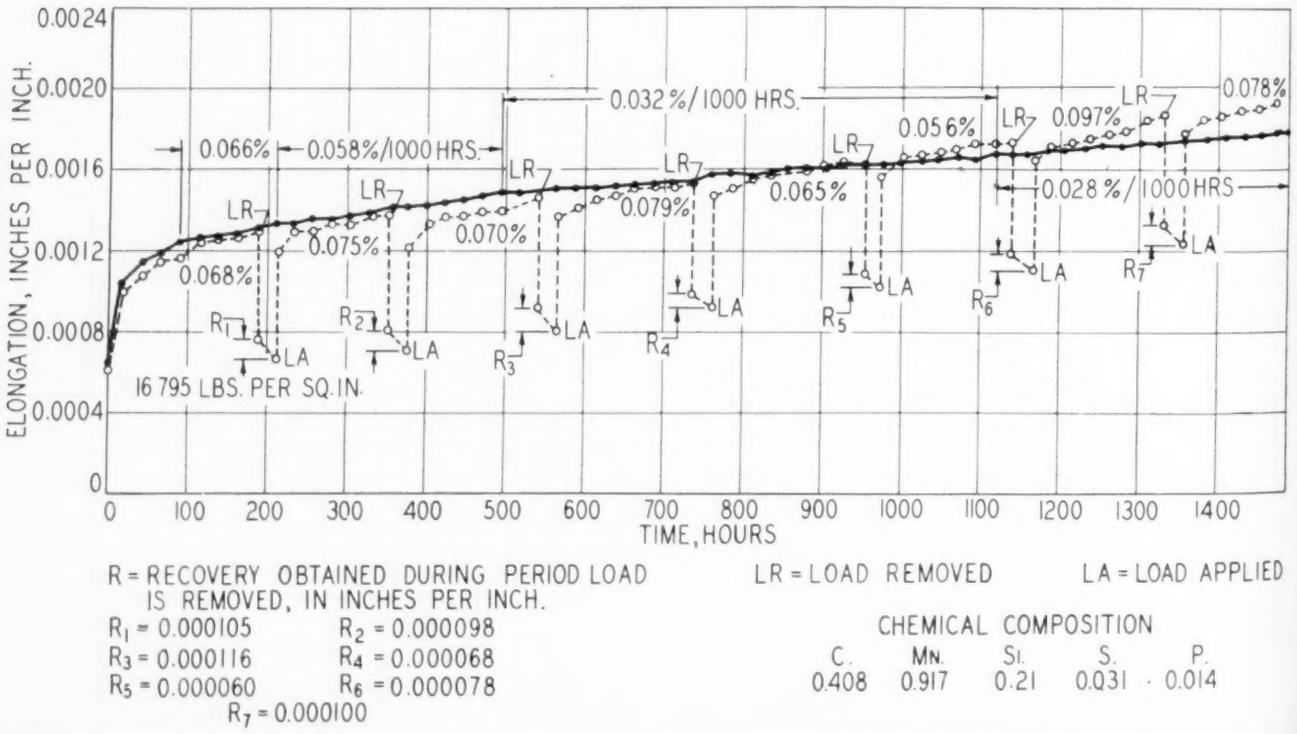
Type of steel	Analysis, per cent C	Mn	Si	Cr	W	Mo	Ni	V	Heat treatment	Temp., deg. F.	Stress for designated rate of creep 1 per cent/ 100,000 hrs.	1 per cent/ 10,000 hrs.	1 per cent/ 1000 hrs.
Carbon	0.15	0.50	0.20						N.T.[1] 1200° F.	800	13,000	18,000	25,000
DM	0.07	0.42	0.72	1.25		0.54			Ann.[2]	800	20,000	29,500	42,500
Cr-Mo	0.10	0.45	0.18	5.09		0.55			Ann.	800	14,250	22,000	34,000
C-Mo	0.16	0.49	0.30			0.49			Ann.	800	21,500	27,000	34,000
MM9	0.15	1.28	0.29			0.28			N.T. 1200° F.	800	25,500	34,000	45,000
17-22	0.45	0.47	0.77	1.40	0.98			0.25	N.T. 1300° F.	800	48,000	68,000	96,000
Carbon	0.15	0.50	0.20						Ann.	1000	3,200	6,800	14,500
DM	0.07	0.42	0.72	1.25		0.54			Ann.	1000	15,000	24,000	37,500
Cr-Mo	0.10	0.45	0.18	5.09		0.55			Ann.	1000	7,000	10,250	12,900
Cr-W	0.08	0.42	0.20	4.88	1.10				Ann.	1000	5,650	8,400	12,500
C-Mo	0.16	0.49	0.30			0.49			Ann.	1000	9,600	15,800	26,000
MM9	0.15	1.28	0.29			0.28			N.T. 1200° F.	1000	4,650	9,800	21,000
17-22	0.45	0.47	0.77	1.40	0.98			0.25	N.T. 1300° F.	1000	13,750	24,000	42,500
4140	0.40	0.60	0.25	0.92		0.18			O.Q.T.[3] 1140° F.	1000	3,700	7,400	15,000
Cr-Ni-Mo	0.39	0.68	0.27	0.72		0.32	1.74		O.Q.T. 1125° F.	1000	.....	780	13,500
4615	0.14	0.53	0.28			0.25	1.85		N.T. 1200° F.	1000	4,600	7,700	13,000
3140	0.36	0.60	0.26	0.56			1.33		O.Q.T. 1000° F.	1000	190	1,000	5,250
6140	0.40	0.75	0.21	1.01				0.17	O.Q.T. 1200° F.	1000	1,400	3,900	8,800
DM	0.07	0.42	0.72	1.25		0.54			Ann.	1200	1,950	3,950	8,100
Cr-Mo	0.10	0.45	0.18	5.09		0.55			Ann.	1200	900	2,500	5,250
C-Mo	0.16	0.49	0.30			0.49			Ann.	1200	780	1,650	3,550
MM9	0.15	1.28	0.29			0.28			N.T. 1200° F.	1200	420	1,000	2,400
17-22	0.45	0.47	0.77	1.40	0.98			0.25	N.T. 1300° F.	1200	540	1,200	2,650

[1]N.T. = Normalized and tempered [2]Ann. = Annealed [3]O.Q.T. = Oil quenched and tempered

variations corresponding to the thermal history of the steel. The significance of the carburizing test for grain size depends entirely upon the fact that many physical properties of steel have been correlated with the grain size ratings.

At temperatures below the lowest temperature of recrystallization (equicohesive temperature) the structurally fine-grained material possesses the better creep resistance, while at higher temperatures the coarse-grained structure has the greater resistance to creep. The inherent grain size definitely affects the creep strength of steels. In Table IV are listed the results of an investigation of coarse and fine-grained carbon-molybdenum steels that contained 0.15 carbon, 0.49 manganese and 0.49 per cent molybdenum. The coarse-grained material had an A. S. T. M. grain size rating of 4 to 5, the fine-grained a rating of 8. Both steels had essentially the same composition and were tested in the annealed condition.

It was supposed that the coarse-grained steel would have a larger mean crystal size than the fine-grained steel after annealing and consequently smaller intergranular surface area along which creep movement could take place at temperatures above the equicohesive temperature. The higher creep strength of the coarse-grained steel except in the tests at 800 degrees Fahr. for the slower rates of creep sustains the correctness of this supposition. From the tests at 800 degrees Fahr. for a creep rate of 1 per cent per 1000 hours, it may be inferred that metal flow at such a fast rate is not creep but represents a rate of extension corresponding to tensile testing with slowly applied load. The equicohe-



R = RECOVERY OBTAINED DURING PERIOD LOAD IS REMOVED, IN INCHES PER INCH.

$R_1 = 0.000105$ $R_2 = 0.000098$
$R_3 = 0.000116$ $R_4 = 0.000068$
$R_5 = 0.000060$ $R_6 = 0.000078$
$R_7 = 0.000100$

LR = LOAD REMOVED LA = LOAD APPLIED

CHEMICAL COMPOSITION

C.	Mn.	Si.	S.	P.
0.408	0.917	0.21	0.031	0.014

Fig. 4—Time-elongation curves for grade B steel at 850 degrees Fahr. under intermittent loading

sive temperature of the carbon-molybdenum steel apparently lies between the limits of 800 and 1000 degrees Fahr.

Other compositions of coarse and fine-grained steels have been investigated for which the creep test results are similar. The writers believe, however, the coarse-grained steels are not enough stronger than the fine-grained steels in the important range of industrial temperatures to urge a preference for coarse-grained steels.

Table II

Creep Characteristics of Manganese-Molybdenum Steels

All steels normalized and drawn at 1200 degrees Fahr.

Designation	Analysis, per cent C	Mn	Si	Mo	Temp., deg. F.	Stress for designated rate of creep, 1 per cent/ 100,000 hrs.	1 per cent/ 10,000 hrs.	1 per cent/ 1000 hrs.
MM10	0.13	1.10	0.36	0.20	900	10,200	17,250	29,000
MM9	0.15	1.25	0.19	0.25	900	14,250	24,500	33,500
MM11	0.13	1.46	0.12	0.22	900	10,200	17,000	28,000
MM8	0.15	1.88	0.15	0.25	900	11,500	20,000	30,000
MM2	0.15	2.06	0.19	0.21	900	9,600	14,000	20,000
MM4	0.16	2.99	0.23	0.24	900	7,100	9,200	20,000

Temperature of Recrystallization

The belief already has been expressed that the lowest temperature of recrystallization after maximum strain-hardening coincides with what Jeffries and Archer called the equicohesive temperature. At temperatures below the recrystallization temperature materials can withstand large stress without creep, while above this temperature even small stress will cause creep. The position of the lowest temperature of recrystallization also may change the slope of the curves produced when stress values are plotted against rates of creep on logarithmic co-ordinates. The slope of the curves increases for temperatures above the lowest temperature of recrystallization.

Table III

Influence of Heat Treatment on the Creep Characteristics of S. A. E. 1015 Steel at 1000 Degrees Fahr.

Symbol	Heat treatment	Stress for designated rate of creep, 1 per cent/ 100,000 hrs.	1 per cent/ 10,000 hrs.	1 per cent/ 1000 hrs.
1015A	Hot-rolled	7000	12,800	15,800
1015B	Normalized at 1725, tempered at 1200° F. (1 Hr.)	4900	9,900	12,100
1015C	Annealed at 1550° F.	3000	6,200	12,900
1015D	Normalized at 1725, tempered at 1200° F. (168 Hrs.)	2750	5,800	8,200

Method of Loading

The most common ways of applying load in the creep test are known as the single-step, up-step and down-step methods. Typical results of these three methods of loading for a carbon steel at 850 and 1000 degrees Fahr. are shown in Figs. 1 and 3. The up-step method tends to give low creep strength values, the down-step method high values; the results of the single-step method are usually intermediate.

Creep can be considered a differential effect of the high-temperature strain-hardening and self-annealing of the steel under stress. In the up-step method of loading the amount of strain-hardening is the minimum; the balance of strain-hardening and self-annealing then will favor rapid creep for a fixed stress. In the down-step method of loading the strain-hardening more than counterbalances the self-annealing so that creep diminishes owing to the increased loading capacity of the steel. The single-step method of loading is evidently a compromise between the other two.

Intermittent Heating and Loading

In commercial applications of high-temperature steels, parts are seldom held continuously at the operating temperature; periodic shutdowns are usually necessary. Sometimes the steel may be maintained at high temperature for long periods under changing or interrupted stress. Consequently, the creep of steels subjected to irregular heating and loading is of interest.

Fig. 4 shows the results of an experiment to determine the effect of intermittent loading on creep. A plain carbon steel was tested at 850 degrees Fahr. under a stress of 16,795 pounds per square inch. With continuous loading the rate of creep was 0.066 per cent per 1000 hours by the time the test had run 200 hours; the rate of creep then decreased gradually until it fell to 0.032 per cent per 1000 hours. With intermittent loading the so-called first stage of creep was observed upon each repeated application of load and the rate of creep ranged 0.056 to 0.097 per cent per 1000 hours, which is nearly the same as in the initial stage of the test run with continuous loading. Because the rate of creep for continuous loading decreases and for intermittent loading increases with time, the plastic deformation due to the intermittent loading will be the greater. In similar tests at 1000 degrees Fahr., intermittent loading did not appear to affect the creep appreciably.

Intermittent heating alone, and intermittent heating in conjunction with intermittent loading had no significant effect on the normal creep of this steel at 850 or 1000 degrees Fahr.

As there are so many factors affecting the creep strength of steels and the results of creep tests, engineers may well be circumspect in applying data obtained on material for which a complete history is not available. Likewise, discrimination is well repaid in the selection of materials intended for use in high temperature service.

Find New Mineral Deposits

Deposits of beryllium ore, in a vein 12 feet thick and 50 feet wide, have been discovered near the site of Grand Coulee dam, Washington, according to reports from the district. Surveys also have uncovered deposits of manganese, tungsten, chromium and nickel.

Table IV

Creep Strength of Coarse and Fine-Grained Carbon-Molybdenum Steel

Inherent grain size	Temperature, deg. F.	Stress for designated rate of creep, 1 per cent/ 100,000 hrs.	1 per cent/ 10,000 hrs.	1 per cent/ 1000 hrs.
Coarse (4-5)	800	15,500	26,000	44,500
Fine (8)	800	21,500	27,000	34,000
Coarse (4-5)	1000	10,700	17,800	29,200
Fine (8)	1000	9,600	15,800	26,000
Coarse (4-5)	1200	480	2,000	4,050
Fine (8)	1200	260	1,400	3,400

Seawalls of Sheet Steel Piling Guard Coast Highway

CONSTRUCTION of nearly ¾-mile of seawall is one of the principal features of a contract which is now in progress for improving 8.47 miles of the coast highway immediately northwest of Ventura, Calif., from Ventura to Mussel Shoal. The work is described by R. C. Meyers, assistant engineer, in *California Highways and Public Works*, published by the California Highway commission, Sacramento, Calif. The highway lies between the cities of Ventura and Santa Barbara and carries a considerable volume of local traffic in addition to the heavy through traffic.

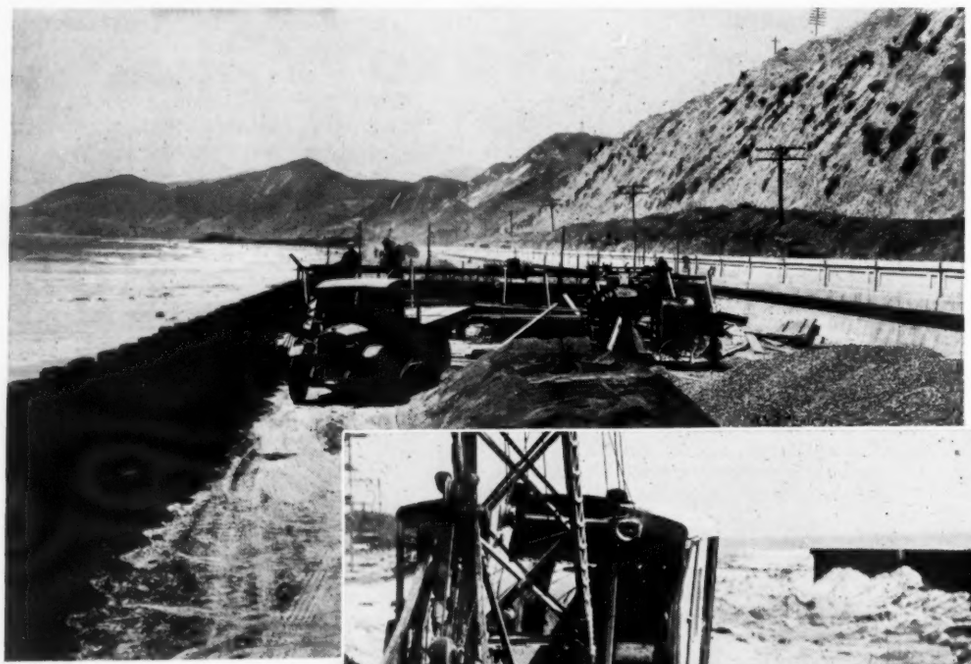
The location of this route between Ventura and the Santa Barbara county line originally was confined to extremely narrow limits on account of the topography of the territory, and any widening or other improving of this section has been correspondingly difficult.

Back a short distance from the shore line a range of rugged bluffs rises sharply. These bluffs are so steep and rough that the cost of construction of a highway along their slopes would be almost prohibitive. The Coast line of the Southern Pacific railroad, built years before the state highway was constructed, follows a right of way back from the beach and as near the base of the steep mountains as practicable. The only site left for the highway was the narrow strip of land between the railroad and the ocean.

In 1912 and 1913 a 15-foot concrete pavement was constructed, following the railroad right of way as closely as possible. Later, when increasing traffic made it necessary to widen the pavement and roadbed, this work had to be done on the ocean side on account of the proximity of the railroad on the land side. At a few places where the ocean encroached too closely to the highway embankment to permit such widening without some protective work, reinforced concrete seawalls were constructed against which to rest the widened highway embankment. This work was completed in 1927 and the seawalls constructed at that time have successfully resisted erosion by the ocean.

Traffic requirements since have made it necessary again to widen the the pavement and roadbed of this route, and with this further increase in width there are even greater lengths of roadway embankment which would be exposed to wave action unless shore protection work were placed. Although the reinforced concrete seawalls formerly built answered the purpose well, their construction was expensive.

A total of 3802 lineal feet of seawall is required on the present contract to permit widening the roadbed to 80 feet to provide room for a 30-foot pavement with wide oiled shoulders and future widening of the pavement which will eventually be



INSTALLATION of interlocking sheet steel piling to an elevation of 10 feet, as shown at the left, permitted widening and rerouting the coastal highway from Ventura to Mussel Shoal, Calif.

TO KEEP the piling in line, tie rods extending to concrete deadmen were used, as shown at the right. Tops of the piling are covered with timber wales, caps and steel throwback plates bolted in place

necessary. Several plans were proposed, but the one which was the greatest promise of economy and success involved construction of these walls of interlocking steel sheet piling. The total cost of constructing the walls of this material is estimated to be $83,000.

Three walls are being constructed at exposed locations, being 642, 2500 and 660 feet in length, respectively. The construction consists of interlocking steel sheet piling driven down through the beach sand and into solid clay or shale beneath. Each sixth pile or "anchor pile" is driven 3 feet deeper than the intermediates.

The tops of piles are driven to elevation of 10 feet, the line of the tops being held securely by creosoted Douglas fir timber wales and caps. Steel throwback plates ⅜-inch in thickness are bent to fit the piles and wales and bolted on the ocean side. The entire assembly at the top of piling, including wales, caps and throwback plate, is held in line securely by tie rods which extend to concrete deadmen back of the walls.

The life of these structures depends to a large extent on protecting the metal from the corrosive action of the salt water, and much time and effort have been expended by the engineers in the district endeavoring to determine the most effective methods of treating the piles.

Steel Given Protective Coat

Piling was unloaded from trucks and spread out in rows on timbers placed as high on the beach as possible. Rust and mill scale were removed by wire brushing and quick drying prime coats applied. After the prime coats had dried, hot asphaltic coatings were applied to about ⅛-inch thickness. In order to protect these asphaltic coatings from chipping during driving, the engineers designed special roller leads to keep the piles in line.

One of the greatest difficulties has been found to be with the 3 or 4-foot scour line where pebbles are hurled against the piling with terrific impact by the waves. Here the protective coating was soon worn off and other means of protecting the metal had to be developed. As the time between tides was limited, a fast drying primer was used after which fairly hot airblown asphalt was applied and slightly damp beach sand thrown against the asphalt. This coating was built up to about ¼-inch in thickness and so far has successfully resisted the erosive action of the waves.

For the work, 41,800 lineal feet of sheet steel piling was furnished by the Bethlehem Steel Co. through McClintic Marshall Corp. of Los Angeles. In addition about 100 tons of structural steel was used. Basich Bros., Torrance, Calif., was the contractor.

Porcelain enamel steel sheet panels are held by stainless steel moldings screwed to wood frames so that panels easily may be replaced if accidentally damaged

Porcelain Enamel Steel Bodies with Stainless Trim Used on Milk Trucks

PORCELAIN enameled steel bodies with stainless steel trim have been adopted as standard for trucks operated by Knudsen's Creamery Co., Los Angeles. The accompanying illustration shows four of these renovated trucks, three large ones in the foreground and a smaller truck in the background. The new bodies were fabricated by the Smoot-Holman Co., Inglewood, Calif.

These bodies were built almost entirely of flat panels, chiefly rectangular in shape, so that a minimum of forming was involved and practically all cutting was done on square shears. The nosing over the cabs was hand bumped to shape and the wind shield pillars rolled in hand rolls to the proper radius. Parts for the three large bodies were cut and porcelain enameled at one time to one set of dimensions, with resultant economies as compared with the smaller body which was completed a year ago as an experiment.

Stainless Moldings Hold Panels

The panels were attached with screws and stainless steel moldings so that accidentally damaged panels easily and quickly may be replaced. All of the molding and trim is of stainless steel in the form of No. 20 gage sheets. This material was formed in a brake to a shallow channel mold with holes punched and formed after braking to accommodate nickel plated, brass, oval head screws for attaching the flat porcelain enameled panels to the wood body frame without the use of holes in the panels. Skeleton frame members around the glass in the sedan type cab doors were formed in stainless sheet. The edge molds were formed with a lip to lie around the corner of the body or door and cover the exposed edge of the sheet and corner. Back corners of the body were formed of stainless sheet on a 2-inch radius.

All the signs and decoration except the decalcomania on the rear side door are stenciled into the porcelain and are permanent and fadeless. The decals are of Knudsen's standard paint type and must be renewed at intervals.

While the first cost of the porcelain enameled-stainless steel truck bodies is higher, Knudsen's finds that the cleaning time is reduced greatly and the cost of upkeep is reduced by the fact that the necessity for repainting the bodies is eliminated. With conventionally painted bodies it was the custom of this company to repaint the bodies at least twice a year.

Home of Tomorrow To Be Reopened as Institute

After having been visited by approximately 75,000 persons representing 47 states and 24 foreign countries, the Home of Tomorrow opened Feb. 21, 1934, by the Westinghouse Electric & Mfg. Co., at Mansfield, O., was closed to the public Dec. 2. After redecoration and some remodeling it will be reopened Feb. 1 and will be known as the Home of Tomorrow institute. It will be devoted to training and supervising the work of home economists from all parts of the country and will be completely equipped with electric ranges, refrigerators, kitchen mixers, waffle irons, toasters and many other electrical appliances for home use which will be demonstrated in regular courses of instruction.

Notes on Problem of Stress Relieving Welded Parts

BY W. T. DAVIDSON
Welding Division, Struthers-Wells Co., Warren, Pa.

IT HAS been the fashion in recent years to be "for" or "against" stress relieving of welded steel assemblies in a furnace depending on whether or not one had available a furnace suitable for the work. In other words, everyone who had a furnace favored stress relieving and everyone who did not have a furnace opposed it.

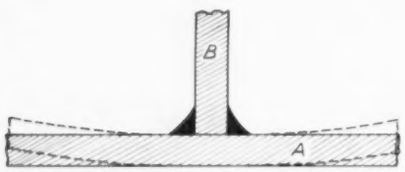


Fig. 1—Typical example of residual stress in welds. If the yield point has not been exceeded, peening the weld and adjacent metal will relieve stress and deformed member A will become straight. If the yield point has been exceeded, stress relieving will not straighten the member because residual stresses of high degree do not exist

But there appears to be a more logical approach to the subject. If residual stresses are present in a welded structure to a damaging degree, they must be removed. Heating in a furnace is usually the most effective method and, other things being equal, the least expensive. In many cases, no matter what the degree of residual stress may be, it is not damaging to the safety or service life of the welded assembly. In other cases, mechanical stress relieving by peening the weld removes sufficient stress for practical purposes. The implications of these broad statements perhaps will justify some discussion of residual weld stresses.

Why Welds Tend to Shrink

Weld metal in gas and arc welding is cast metal and tends to shrink from 3/16 to ¼-inch per foot of length and would shrink but for the fact that it is prevented from doing so by the stiffer metal to which it is fused. The resultant stress or residual stress is set up by contraction forces of the weld metal operating on the resistance to deformation of the metals to which weld metal is fused. In magnitude, such residual stress may be anything up to the yield point of either weld metal or parent metal depending on which is the lower of the two. This limiting value of residual stress from welds may properly receive more attention.

A stress set up by weld contraction may be higher than the yield point during the final stages of cooling of the weld; in fact, it is not uncommon to have weld stresses high enough to cause failure of either the weld or parent metal. But, stresses above the yield point involve plastic deformation and unless the contraction involves a higher rate of flow than the metal can endure (thus causing rupture) the residual stress will be relieved by such plastic flow and it will disappear. The analogous behavior of a tension coupon in a testing machine is of interest.

At stresses involving plastic deformation, it is necessary continually to apply more movement to keep the load constant due to the fact that plastic flow unloads the specimen. If a greater unit load is required it is necessary to push the movement of the testing machine up so that the head moves faster than the normal rate of plastic flow at that unit stress. A localized stress cannot persist in a plastic substance. A rupture may only occur when the rate of movement exceeds the normal rate of plastic flow at a given unit stress. No true picture of conditions in a welded assembly is complete, however, unless we explore probable physical properties of metal which has been subjected to high contractional stresses and some service loading.

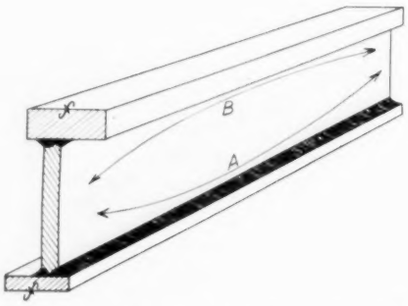


Fig. 2—Typical side rail section of welded steel lathe bed. Longitudinal residual stresses A and B reach equilibrium by deformation. Unless the piece is stress relieved there is likely to be "squirming" during machining operation to finish top and bottom surfaces

On heavy welded structures it is likely that a considerable part of the weld metal has been stressed beyond its yield point by contractional stresses alone. This condition in itself is not a source of danger. But at points of stress concentration due to discontinuities in the weld or abrupt change in contour, service loading may involve stresses high enough to raise continually the yield point of the metal. From the analogy of the testing machine we know that repeated application of loads which result in raising the yield point involves embrittlement of the metal and premature failure.

Stress Relieving Ends Squirming

It is a well known fact that residual stresses will be removed from a welded structure by heating in a furnace to 1200 degrees Fahr. and cooling slowly in the furnace. A welded assembly so stress relieved is in better condition to withstand such above-the-yield-point stresses as may be caused by stress concentrations from discontinuities or changes of contour. But stress relieving of welded steel machinery parts in a furnace is seldom carried out for this cause. The immediate and practical reason is to avoid having the structure behave like a "green" casting in machining operations.

The every-day descriptive term for the behavior of a green casting during machining is that it "squirms." It continues to deform as metal is removed by the cutting tool so that it is difficult and often impossible ever to get the job machined to the required dimensions. Such behavior is explained readily by the presence of strains in the elastic range of the metal. Such strains of necessity are in equilibrium so long as the metal of the structure is not disturbed. Cutting off some of the metal disturbs the state of equilibrium and movement takes place until a new equilibrium is established. Such movements unfortunately do not take place in a few hours but

(*Please turn to Page 60*)

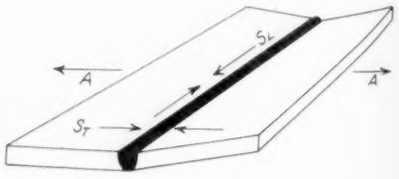


Fig. 3—Showing residual stresses set up in butt welded plates. Residual stress S_L parallel to the weld is usually greater than stress S_T transverse to the weld. Applying tension loading up to the yield point in direction A-A would relieve residual stress in that dimension but, in view of Poisson's ratio, would not necessarily remove residual stress in the dimension at right angles to A-A. Heating in a furnace would relieve stresses in both dimensions

Sheets of Aluminum Foil Insulate New Residence

A new type of residential house insulation whereby sheets of aluminum foil are hung between the outside and inside walls is being practically experimented with by Stevens Building Co., Wilkinsburg, Pa., which is building a medium-priced residence at 237 Oregon drive, New Kensington, Pa., for Walter S. Reirick, Pittsburgh. Three thicknesses of aluminum foil are hung between the innner and outer walls so that they do not touch each other, and thereby providing dead air spaces between the sheets. It is claimed that the insulation reflects heat which finds its way even through thick walls. This type of insulation has been experimented with for some time by the Aluminum Co. of America at its New Kensington, Pa., laboratories.

s s s

Treating Sand Molds for Magnesium Castings

Difficulties encountered in use of ordinary-bonded sand molds for pouring magnesium castings is said to be overcome through use of hexafluophosphoric acid, ammonium hexafluophosphate, monofluophosphoric acid or ammonium monofluophosphate, according to a recent patent. From 0.5 to 10.0 per cent of these compounds are used in the green sand, but preferably 3.0 to 6.0 per cent. For thin section castings, 2.0 to 5.0 per cent is employed.

s s s

Addition of Chromium to Iron Eliminates Chills

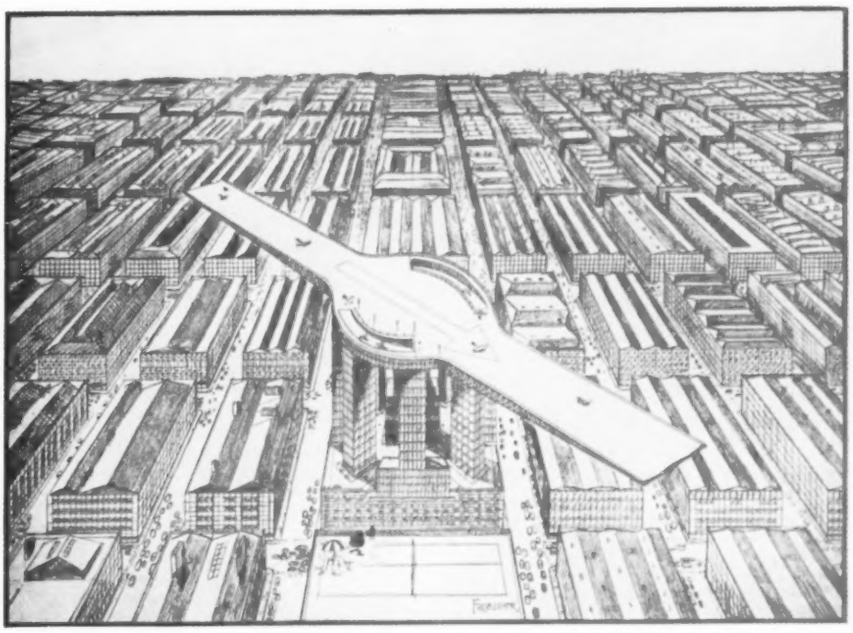
Metal chills for iron castings sometimes can be eliminated by the use of small amounts of chromium. It is the usual custom when the iron is running too soft, to increase the surface hardness where necessary by chilling with metal chills. Addition of small amounts of chromium will likewise impart the desired hardness to the castings and this can be done conveniently through ladle additions of ferrochromium. Usually, 1.0 per cent is sufficient to produce hardness throughout the casting though the effect of the chromium is somewhat influenced by the original analysis and structure of the iron.

s s s

Complex Alloy Cast Steels More Difficult To Make

As the composition becomes more complex, cast steel manufacturing

Tomorrow's Reality?



"TENTH WONDER OF THE WORLD"—THE STEEL ROTARY CITY AIRPORT: Thus writes Col. R. A. B. Trevelyn, Norfolk, England, in describing the project of his associate, Capt. Charles Frobisher, distinguished English engineer, formerly director general of the Institution of Highway Engineers of that country, and one time principal of the School of Aeronautics, Sheffield. This impressionistic drawing illustrates the application of the principle of the rotary elevated airport to the city of New York where, owing to the height of buildings, the landing stage would be 740 feet above the street level. The stage would be supported by eight skyscrapers in hexagonal formation, transmitting the pressure to one large square building at the base. Circular portion at the center of the stage is 650 feet in diameter, with inclined runways to hangars beneath the stage. The cantilever arms are 550 feet long and 400 feet wide. Total length of the projected landing stage is 1750 feet

difficulties increase. Alloy steels in the as-cast condition are somewhat tender and require special shop procedures to prevent cracking. Therefore, complex alloy steel castings require a longer time for finishing than do carbon steel castings. Hence, the ultimate cost increases in greater proportion than the actual cost of the alloying elements and heat treatments.

\$ \$ \$

Cost of Cadmium Spraying

It is estimated that the cost of coating steel with cadmium by the molten metal spray method is about 40 cents per square foot. This figure is for a cadmium coating 0.006-inch thick. It is understood that this cost figure is based on operations at eastern seaboard plants in coating steel with cadmium to protect it against salt water.

\$ \$ \$

Arches Cut in Multiples

A northwestern railroad which is building a number of all-steel passenger coaches is cutting the window arches by means of the oxy-acetylene torch. The arches are made of No. 10-gage steel sheets and are cut in multiples, as many as 16 arches being cut out at one time.

Frozen Pipes Thawed by Arc Welding Generators

Portable arc-welding generators can be used advantageously in thawing frozen pipes, particularly when the pipes are underground or otherwise inaccessible. The leads from the generator are connected to the pipe so as to include the frozen section in the electrical circuit and as the voltage is adjusted to provide a heavy current, the ice is melted. It has been the experience of some users that 250 amperes will thaw a ¾-inch pipe 300 feet long in from 3 to 10 minutes; a 3-inch pipe 100 feet long will require nearly an hour with a current of about 500 amperes. Depending upon the resistance of the pipe, voltages involved vary widely, usually between 10 and 50 volts. Because of their special electrical characteristics, arc welding generators are capable of delivering heavy currents at low voltages.

Foremen Invested with Responsibility

Are Key Men to Success of Industry

NO SUBSTITUTE for a good foreman in modern industrial organization has been found, because, through his unique position he can exercise a dual responsibility of considerable importance both to his employer and to the men under his authority. This is the observation of J. F. Tinsley, vice president and general manager, Crompton & Knowles Loom Works, Worcester, Mass., who further states in *Executive Service Bulletin* of the Metropolitan Life Insurance Co., New York, that having been selected from among his fellows because of qualities of leadership, the foreman is invested with the responsibility of looking after a portion of his employer's property and business, and of reciprocating in turn the special confidence reposed in him. Thus, he becomes the most direct constant representative of his employer in intimate contact every working day of the year with the employes assigned to his charge.

From the employes' side, who is better qualified than the foreman to represent them before management? The employe wants a friendly and practical contact with his employer whereby he can take up and have adjusted simply, quickly and easily such matters in connection with wages, working conditions, etc., as are apt to come up from time to time.

The machine operator of today may be the plant foreman of tomorrow

Whatever may have been the foreman's responsibility in industry in the past, it would appear that the conditions of the future would require intelligence, knowledge and cooperation on his part more than ever before.

Weekly conferences of about one-half hour duration with superintendents, foremen and assistant foremen are found to be of value. Production schedules and other routine matters, business conditions and general economic problems should be considered. Experience discloses that the foremen appreciate being taken into the management's confidence and in being advised of the company's business and problems.

From time to time, as conditions warrant, instruction courses conducted for foremen assist them in handling departmental problems more intelligently. Courses should cover general economic principles as applied to industry, relation of production to costs, labor turnover and its effects, machine efficiency and its relation to wages and production, overhead, and what constitutes a financial statement of a manufacturing concern. An efficient method of appraising foremen will enable management to see "minus" performances clearly, to promote foremen on merit, and to create means and methods for securing improved results.

How to Rate Foremen

From the standpoint of the foreman an appraisal method of rating at regular intervals gives him a better appreciation of his responsibilities and opportunities and enables him to get an accurate picture of himself and his efforts in the plant management program.

A comparatively simple and effective means of appraising foremen annually involves the preparation of a "Foreman Management Report" to emphasize its and his function in the management of the business. A financial basis is computed for the report of each man, his portion of the business, so to speak. Based on floor space occupied, the value of plant, machinery, tools and equipment, as represented on the company's books, is prorated to each foreman. This, with his own direct labor and shop overhead attributable to him, makes up his year's business. Thus, is brought to each one a definite conception of the financial responsibility that is in his keeping. It is surprising what a different appreciation a foreman has of his job when he knows the money value represented by it.

This method of rating each job naturally gives an unusually favorable opportunity for educating the foreman as to the problems of business management, including a know-

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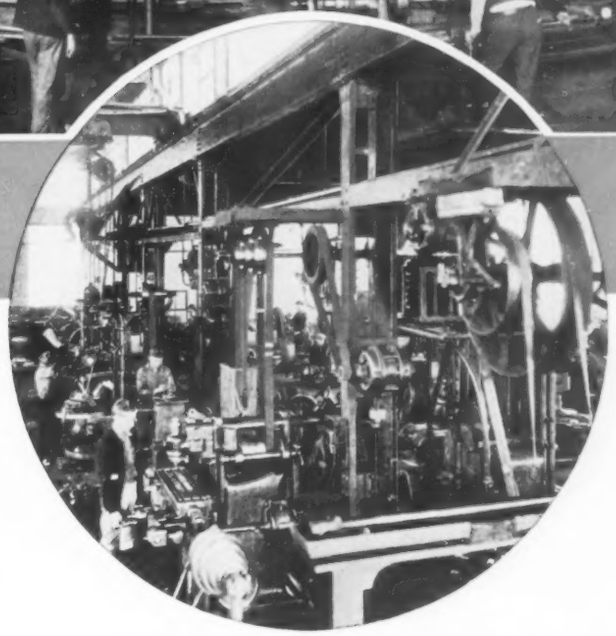

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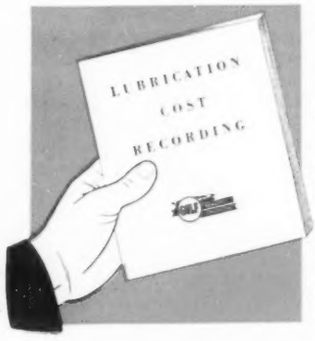

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ledge of costs and simple cost finding, overhead, labor turnover, the importance of quality, the use of equipment and the planning of operating schedules so as to give the maximum of efficiency.

A standard of credits is established and a committee goes over each foreman's report and rates him strictly on perfomance. The rating is established on quality, production, handling men, costs, initiative, administration and improvements.

His rating on initiative is based on his attitude, adaptability and energy, as well as any special ability he may have in initiating new and progressive steps.

This report is sent to the superintendent and a copy to the general manager, who notes the comparison with previous years and writes his observations of the foreman's accomplishments, which always include recognition for improvement, and points out, without being too critical, opportunities for further progress. In turn, the superintendent and his staff and the head of the shop cost division, go over with each foreman his report in detail, outlining opportunities for action.

Results for several years with this method disclose that foremen, through this agency, appreciate the importance of their problems as never before.

Precautions Help ReduceEyeHazards

BEFORE the era of mass production, most eye losses were caused by gunfire, discharges from blasts, and occasionally from flying foreign bodies in machine shops; but, with the advent of high-speed tool steel, which will retain its temper while at white heat, and with rapidly turning lathes, the number of foreign bodies which penetrate the globe is enormously increased," according to Dr. Walter H. Snyder, of Toledo, O., president of the Ohio Commission for the Blind in the current issue of *The Sight-Saving Review*, quarterly journal of the National Society for the Prevention of Blindness. "Unfortunately many of these metallic materials are nonmagnetic and it is more difficult, therefore, to remove them from the eye without doing considerable damage.

"While there has been a reduction in the number of accidents to workers using hand tools, it has been offset by a vastly increased number of accidents to machine tool workers. The use of abrasive wheels, emery, carborundum, etc., together with the polishing materials, also has increased the number of accident cases having minute foreign bodies embedded in the cornea.

"Electric welding, now become a much used technique in industry, has also taken its toll of sight. Unless the operator's eyes are carefully shielded — and many of the masks are insufficient protection — the lids may suffer a burn and blind spots may develop in the retina. It has not been realized that bystanders, especially those working in proximity, may suffer almost as much as the operator.

Screens Stop Flying Particles

"In mass production, where much of the material is produced by automatic machinery, there will always be the danger of flying particles from one machine hitting an operator at another machine, even as far away as 30 feet. It would seem that there could be a set-up of machines in irregular intervals that would lessen this danger, or that a screen of plate glass could be interposed between these machines or around them to prevent accidents.

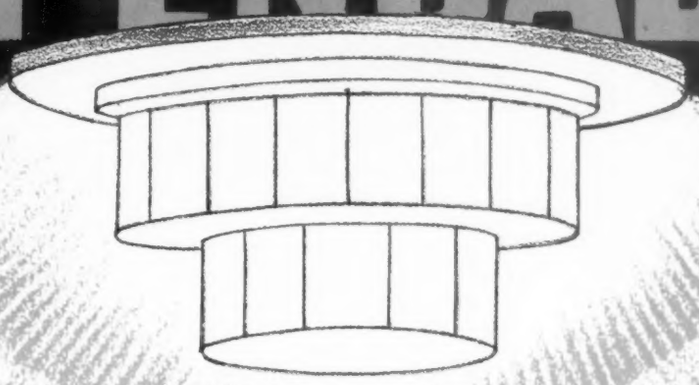
"One rule which I think should always be enforced is that any man grinding a tool on an abrasive wheel, unless the wheel is amply protected by plate-glass guards, should himself wear goggles. Another regulation to which I think there should be no exception is that any man who has lost the vision of an eye should wear a glass on the remaining eye for protection from foreign bodies, even though no correction is needed in the glass itself. I have had a few cases where the second eye was lost in the same manner as the first, when the loss of both eyes easily could have been avoided by the simplest kind of glass, as the particles are so small they do not break the lenses. It is interesting to note how few eyes have ever been injured by broken glass from the spectacle lens.

"The safety-first programs should include instructions against the use of files and very highly tempered steel for punches, when they are not intended for that purpose, and also against the use of cheap cast-iron

Four Links Within a Link

CRAFTSMANSHIP FROM THE OLD OX ROAD: F. D. Rideout, contracting manager, American Bridge Co., Cleveland, picked up this old ox chain on the farm of W. King, Medina, O., in whose possession it has been for 50 years, and who acquired it from another farmer who brought it from New England many years before. It is a duplex chain, impossible to kink, hand forged from ¼-inch diameter iron rod. The iron shows little corrosion. Each link contains within itself four other links, and the chain 19 inches long tapers evenly from a width of 1¼ inches to 1 inch. The upper photograph is full size of a section. Sidewise, the chain has the appearance of two rods twisted closely together. It represents a type of craftsmanship in iron that is rapidly disappearing

DEPENDABLE



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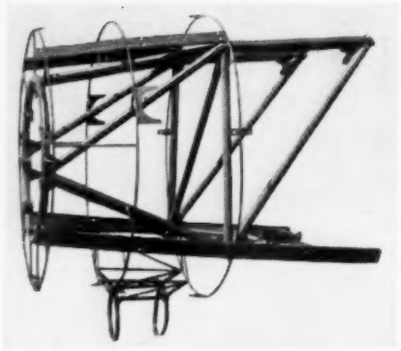
hammers which are often thought to be good enough for houseold use. In industry, hammers of lead or copper should be supplied and battered punches either ground off or replaced."

Booklet on Tempering and Aging Is Available

"Prolonged Tempering at 100 Degrees Cent. and Aging at Room Temperature of 0.8 Per Cent Carbon Steel" is the title of a 12-page illustrated booklet now on sale by the superintendent of documents, Washington, for 5 cents per copy. The paper is a report by G. A. Ellinger and R. L. Sanford on research work at the national bureau of standards. The report deals with the effects of heat treatment and aging on magnetic properties of steel.

Engine Mount from Tubing In 19 to 1 Weight Ratio

In the fabrication of aircraft engine mounts the Bellanca Aircraft Corp., New Castle, Del., uses chrome molybdenum seamless tubing of S.A.E. 4130-X analysis as follows: Carbon 0.25 to 0.35 per cent; manganese 0.50 to 0.80 per cent; phosphorus, maximum, 0.04 per cent; sulphur, maximum, 0.05 per cent; chrome 0.50 to 0.80 per cent; and molybdenum in the range from 0.15 to 0.25 per cent.



Airplane motor and accessories weighing 1657 pounds are supported in this 85-pound mount fabricated from chrome-molybdenum seamless steel tubing

The tubing is supplied by the Summerill Tubing Co., Bridgeport, Montgomery county, Pa., in the normalized condition. That is, after final drawing it is heated above the critical point of 1600 degrees Fahr. and then air cooled. This treatment results in a yield point of 85,000 to 110,000 pounds and an ultimate strength of 100,000 to 125,000 pounds. In this normalized condition the tubing readily can be welded without seriously changing the physicals. This type of tubing was selected for this application as best meeting extreme requirements in weight-strength ratio and resistance to vibration.

In the accompanying illustration is shown a mount for a 650-horsepower aircraft motor. The framework is entirely of seamless tubing of the analysis mentioned with all joints welded. The complete structure weighs 85 pounds whereas the motor and accessories supported by this mount weigh 1657 pounds or a weight ratio of 19 to 1.

Haul Concrete at Norris Dam

TVA USES GAS-ELECTRIC LOCOMOTIVES: Four 10-ton Plymouth-Westinghouse gas-electric locomotives are being used by the Tennessee Valley authority to haul the nearly 1,000,000 cubic yards of concrete required for the Norris dam. As shown, Insley cars are hauled from the concrete mixing plant, the locomotive generators supplying power to motors which tilt the 4-cubic yard skips into the hand dump concrete buckets on cableways spanning the valley and covering the entire dam, spillway and power house area. The 12-foot locomotives have starting tractive effort of 5000 pounds with 25 per cent adhesion; continuous tractive effort is 1650 pounds; free running speed is 15 miles per hour; speed under continuous tractive effort is 10 miles per hour

Gas Welding Manganese Steel Develops Brittleness

To the Editor:

In STEEL for Aug. 6, p. 31, I noticed a writeup entitled "Welding Procedure Developed for Repairing Manganese Steel Parts."

There are a number of fallacies in this article. In using the torch to weld manganese steel, the steel surrounding the weld is heated to red heat over a considerable area. The larger the casting, the more this holds true. The result of this heating of manganese steel is to make it brittle. In fact, it restores the heated metal practically to the original cast condition, and destroys completely the effect of the heat treatment given the casting before it was shipped. As a result it is absolutely necessary, in the case of gas welds of castings of any size, that the entire casting be re-heat treated.

In the article it was stated that the casting should be re-heat treated, "if the weld is to withstand considerable stress." It was added, however, that this is seldom the case because manganese steel is used chiefly for its abrasion and shock-resisting properties. If you can tell me how a manganese steel casting is to resist shock, without the shock setting up considerable stress in the casting, I should be greatly obliged. As a matter of fact, by far the largest proportion of manganese steel castings have to resist great stress in service, and weak brittle welds will not hold up. For obvious reasons no one knows this better than the makers of manganese steel.

Now, if you can tell me how the average outfit, making a weld in a manganese steel casting, is to raise the whole casting to 1940 degrees Fahr. and quench it in water, I should again be greatly obliged. As we all know, not one welding outfit in 10,000 and not one customer in 1000 is equipped to re-heat treat a casting at all. For this reason gas welding of any but small manganese steel castings is not to be recommended.

JOHN HOWE HALL
Technical Assistant to the President,
Taylor-Wharton Iron & Steel Co.,
High Bridge, N. J.

Legislation Forces Change in Equipment Buying Policies

BY J. E. PADGETT
Spicer Mfg. Corp.

EACH group in a business naturally feels that its particular field is the outstanding one and should receive the greatest consideration. This has resulted in numerous articles and papers on the subject of definite segregation of cash reserves for machinery purchase, which reserves should not be used for other divisions of the business. A successful business, however, is the result of a carefully balanced grouping of the financial, engineering, sales and manufacturing operations. To be successful, none of these can be given a greater advantage at the expense of the others. As production men, we have to determine to the best of our ability the real needs for expenditure in the tools of manufacture, but we must be careful that money spent on such fixed assets does not rob other activities to the detriment of the entire business.

Working Capital Has Shrunk

For the last several years there has been a decided shrinkage in working capital of most manufacturing institutions, primarily due to the extremely low operating rates effective during the depression and the resulting losses which have had to be met by cash payments that have reduced the actual working capital. This shrinkage has been intensified by a load of bad debts, shrinkage of inventory values, losses from the sale of used equipment not properly depreciated and excessive overhead charges resulting from excessive or ill-advised plant, equipment, machinery and personnel. We cannot help but learn as a result of our experience in the last two years that if a business is to carry on through difficult periods it must be free from excess fat in the way of unnecessary personnel or equipment.

The conditions outlined above are probably pretty well worked out now and we would be on the road to more normal operation, except that in the last few months, the acts and policies of the federal government seem to have turned distinctly toward measuses that will carry on and even intensify these conditions. The result of tax measures will be a freer distribution of cash in the way of dividends (if earned) and will result in less surplus than has been customary in the past. This will reduce the amount of capital available for putting into fixed assets either of a replacement nature or for expansion. Government policies regarding the operation of the banks also greatly affect the ease of obtaining necessary additional capital or liquid funds. Policies of the NRA tend to the keeping of everything in a status quo as far as machinery development and addition is concerned and it tends to increase costs considerably without affording even a reasonable return on the investment or work done.

IN THE accompanying article, prepared from a paper presented before the Production meeting of the Society of Automotive Engineers in Detroit, Oct. 10-11, the author directs attention to the fact that general machinery and equipment policies in the automotive industry probably will undergo a very radical change in the future if the present legislative program of the government and unsatisfactory financial conditions continue. He urges concerted effort to swing the trend so that economic law can function normally. The author is factory manager, Spicer Mfg. Corp., Toledo, O.

It is probable that the best place for the limited working capital in many businesses is to have it invested in consumption goods where it can be liquidated quickly as changes occur. This probably will continue until the government's policies are stabilized and we know how to chart our future course. Prices of such consumption goods will fluctuate reasonably close to any inflation measures and so will tend to protect the real value of the work stored up in the form of cash or goods. With limited working capital available it probably will be concentrated in the distribution end of the business where it can bring the greatest return, especially with an overabundance of available fixed equipment already in existence. It must be remembered that one dollar in fixed assets is frozen for some years, but that same dollar used for current business needs and in distribution has the chance of increasing the gross business by $20 or $30 because of turnover and the credit that it will sustain.

It is also difficult in these trying times to use proper judgment regarding the possible obsolescence of equipment that may be desirable. Present conditions engender inventiveness on the part of machine builders to try to stimulate sales for new types of equipment where they are unable to create any volume on former standards because of the unused equipment available. Under these conditions a machine that would seem to be a useful purchase today may become obsolete in six months because of radical changes in methods developed in the meantime. This would be the normal result of the present situation. It does not work freely because of artificial restrictions but may become effective at any time if such restrictions are removed.

The new income tax ruling which changes the method of computing depreciation for income tax purposes probably will change many former cost systems and will cause a different viewpoint when new purchases are contemplated. In brief, this new ruling requires that at the present time, each machine will be checked and its probable remaining useful life in years determined, and from this number of years of future life and actual number of years of past life a rate of depreciation will be determined, and this rate will be effective during the remaining life of the machine. I believe that this kind of a consideration will change radically many of the past practices in the matter of machinery purchases.

Depreciation Rates Too Low

Statistics indicate that the vast majority of businesses have set up depreciation rates that are altogether too low to take care of normal replacement in order to inflate current operating statements. Where insufficient rates have been effective for a number of years, the new tax ruling is going to be unfortunate because the manufacturer will be unable to use the difference between his high book value on the equipment and the lower value created by the new income tax set up as an offset in the calculations of his earnings for future income tax purposes. In general, the writer believes the result of this will be an increase in depreciation rates and a consequent increase in the unit value of fixed charges carried into product cost through the burden account.

Many businesses in the past have spent money freely for new fixed equipment, when it seemed profitable, because it was easy to obtain additional capital from the banks in the form of loans or by the sale of securities. Present government policies have made it practically impossible to obtain capital in either of

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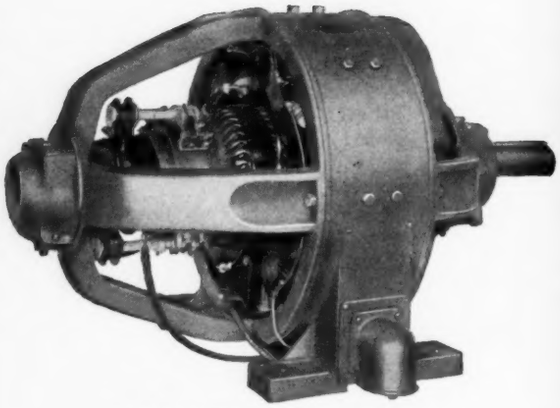

G-E Type CD direct-current motor

G-E Type B direct-current motor

G-E Type B totally enclosed, fan-cooled motor, also available in Type CD

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008-11

GENERAL ELECTRIC

these ways. The present requirements for liquidity of banks and the policies governing loans and deposit insurance pretty much require that banks restrict themselves to commercial operations in which loans are made on the current movement of goods where these loans can be liquidated in 30 or 60 days, and it is very difficult for the banks to consider the tieup of cash into long term loans on fixed assets. The newly enacted legislation governing the sale and trade of securities practically has stopped the issuance of bonds, stock, etc., and has made it almost impossible to raise additional capital in this manner.

Operation of the NRA, the various labor boards and other governmental bureaus all tend to increase the hazard of doing business, the cost of doing business and reduce the returns to the vanishing point, or turn these into losses. It discourages the use of lower cost equipment because, in their view, this makes less jobs instead of more. They seem to forget that these measures which produce high cost, result in a shrinkage of purchasing that has tremendously greater effect in the loss of jobs.

Importance of Low Prices

The automotive industry always has had as its first principle, the increase in consumption resulting from low price and has built its whole vast structure on that basic principle. Is it to be changed to methods that must fail? Under these conditions there is no incentive for capital to risk more than it now has at stake. In general, the present trends on the part of the government are such as to indicate an approach to the practical confiscation of capital, the taxation of earnings to the point of their disappearance, the elimination of returns commensurate with the work done and so it makes the best course for capital one of gradual liquidation of its assets.

In this discussion we must remember that up to 1928 our industry was expanding and certain policies were best under those conditions. It has now reached a point where it probably will no longer expand and the policies must be changed accordingly in the future. It will result in much more conservative practice.

All of this makes a poor case for the purchase of equipment which is not absolutely necessary. If it should work out in this way, it will be a sorry picture for the machine tool builders and eventually for the industry in general, but it seems that these courses are more or less inevitable if the present governmental policies continue along the present lines or along lines more radical than they have been. Those of you who are responsible for the earnings and welfare of thousands of workmen should study and recognize the real troubles that a continuation of present government policies will create. You should have the greatest incentive to lead the way for the vast number of men you are responsible for so that conditions will be made as good as possible for them to make the greatest earnings and do the most work that they can. The writer suggests that you think deeply and seriously about the present government tendencies, not the newspaper ballyhoo but the real result of the present bureaucratic growth and radical theoretical legislation, and after recognizing that, in its essentials, it is destructive of all the principles that have built up our country, should work to change this into one that will be constructive in the future.

New Stainless Steel Drums

STAINLESS STEEL DRUMS USED BY CRACK DRUM AND BUGLE CORPS: To American Legion Post No. 85, Tarentum, Pa., went the championship among Pennsylvania's drum and bugle corps, and second place in the dress parade at the recent annual national convention of Legionnaires in Miami, Fla. Enhancing the resplendent effect of the white and gold of their trim cadet uniforms and the gleaming silver in their trumpets, are drums of glistening stainless steel. These were made up for them at the plant of the Allegheny Steel Co., Brackenridge, Pa.

Professors Have Their Place

The writer has the greatest respect for professors, theorists and idealistic creative thinkers in their proper place. We owe much of our progress to paths they have pointed out. But their place is not in executive positions, either in government or business.

One side of the picture has been brought out and it is not a pleasant prospect. The other side is better and would be in effect if the free flow of normal forces can be allowed to operate. These changes in conditions and thought go in cycles and the old expression "It is darkest before dawn" usually holds. If this is true, it is probable that the conditions of today will awaken people in general to the destruction being created and will cause a reaction.

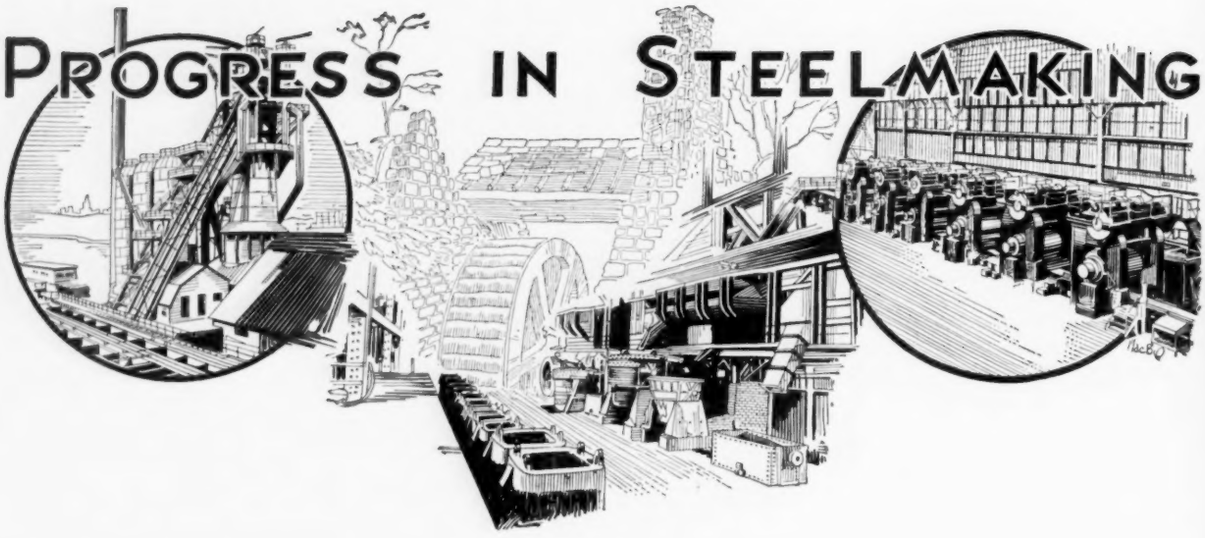
Tax payers in general and business in particular will soon find what it means to pay for tremendous uncontrolled expenditures. It is probable that if the present trends continue and the federal budget is not properly balanced there will come a time inevitably when the government can no longer borrow additional huge sums, freely, and to sustain federal credit it will be necessary to balance the budget, and this can be done only by a drastic increase in taxes.

Long Range View Is Necessary

In the matter of machinery, the writer believes that for long time planning, equipment should be purchased in the most sparing fashion when productive operations are high, and should be purchased in the greatest amounts after passing the bottom of a depression, because these purchases will prepare the business for correct low cost, successful manufacture during ensuing expansion, and also will take advantage of all of the developments and inventiveness that is forced out during hard times. Probably this is the course that would be taken at this time by the successful future businesses if the normal, economic cycle were left to itself and this would tend to start business and prosperity on the up-grade. If we can change the government's attitude so that it will allow the normal operation of economic law, we will rapidly get into this kind of a cycle with general good to everyone, but it will take definite concerted action to swing the trend into this proper course.

With reference to machinery, purchases and cost, it is possible that the next few months will see very few decisions made in this line, and then we will see the permanent trend and it will result in either a complete shrinkage of purchases or a large expansion in purchases. When equipment is purchased for expansion, or to do a job that cannot be done some other way, or for reasons of quality, it is required and these investments are something that are made entirely on the judgment of the management. Machinery purchased to replace existing equipment on the basis of savings to be made, under ordinary conditions, should be purchased only on the basis of present quantities of product and on the labor savings alone. Burden cannot be included in these savings because the purchase of new equipment in general results in an increase in burden instead of a decrease, and this is especially true if the new equipment reduces the actual cost of labor and if the burden is figured on a percentage basis.

PROGRESS IN STEELMAKING



Remains in Service Longer

Tool steel hardened screwdown screws and nuts on the left side of a 36-inch blooming mill in the Great Lakes district remained in service 540 days compared to a campaign of 210 days for 0.65 per cent carbon untreated units, according to recent tests. The treated tool steel members afforded 269,560 more tons of semifinished material to be converted than did the untreated carbon units at a saving of $0.0011 per ton.

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More Heat Is Delivered

Conservation of heat is being effected at blast furnaces by the application of insulation. Bustle pipes now are lined with insulating brick laid in insulating cement and faced with firebrick laid in high-temperature cement. The tuyere stock and gooseneck are lined with 1 inch of insulating cement and then faced with firebrick laid in insulating cement to combat the abrasive action of the hot blast. Blowpipes also are insulated. With the stoves supplying hot blast at a temperature ranging from 1500 to 1600 degrees Fahr. at the tuyeres, the temperature on the exterior of an insulated blowpipe will be about 450 degrees.

Speeds Up Countersinking Operation

CENTERING TUBE BLANKS BY OXYACETYLENE PROCESS: Flame-centering tube blanks, an application of oxyacetylene flame machining, finds growing application in the manufacturing of seamless tubing. The process is an adaptation of "flame drilling" or "punching" consisting of depressing a round hole in the end of a billet for piercing purposes. By properly directing the blowpipe during the operation the dimensions of the resulting hole are made uniform. The operation utilizes the same fundamental principle of chemical reaction as flame cutting. Relatively low oxygen pressures are used. The apparatus is an adaptation of the standard cutting blowpipe, designed to carry the special nozzle necessary for meeting the working conditions

• • •

Requires Plenty of Gas

Heat transfer requirements in soaking pit practice, is best met by a flame of moderate temperature and large gas volume, with high heat transfer characteristics and at the same time without undue tendency to cut or wash according to an authority.

• • •

Eliminates Off-Gage Stock

Installation of centralized lubrication on an 18-inch sheet bar mill practically has eliminated off-gage material, increased the bearing life 1200 per cent, reduced the power consumption 30 per cent and increased the amount of steel rolled per bearing campaign from 12,000 to 150,000 tons. Lubricating the pinion neck bearings serving this mill increased their life by 1000 per cent.

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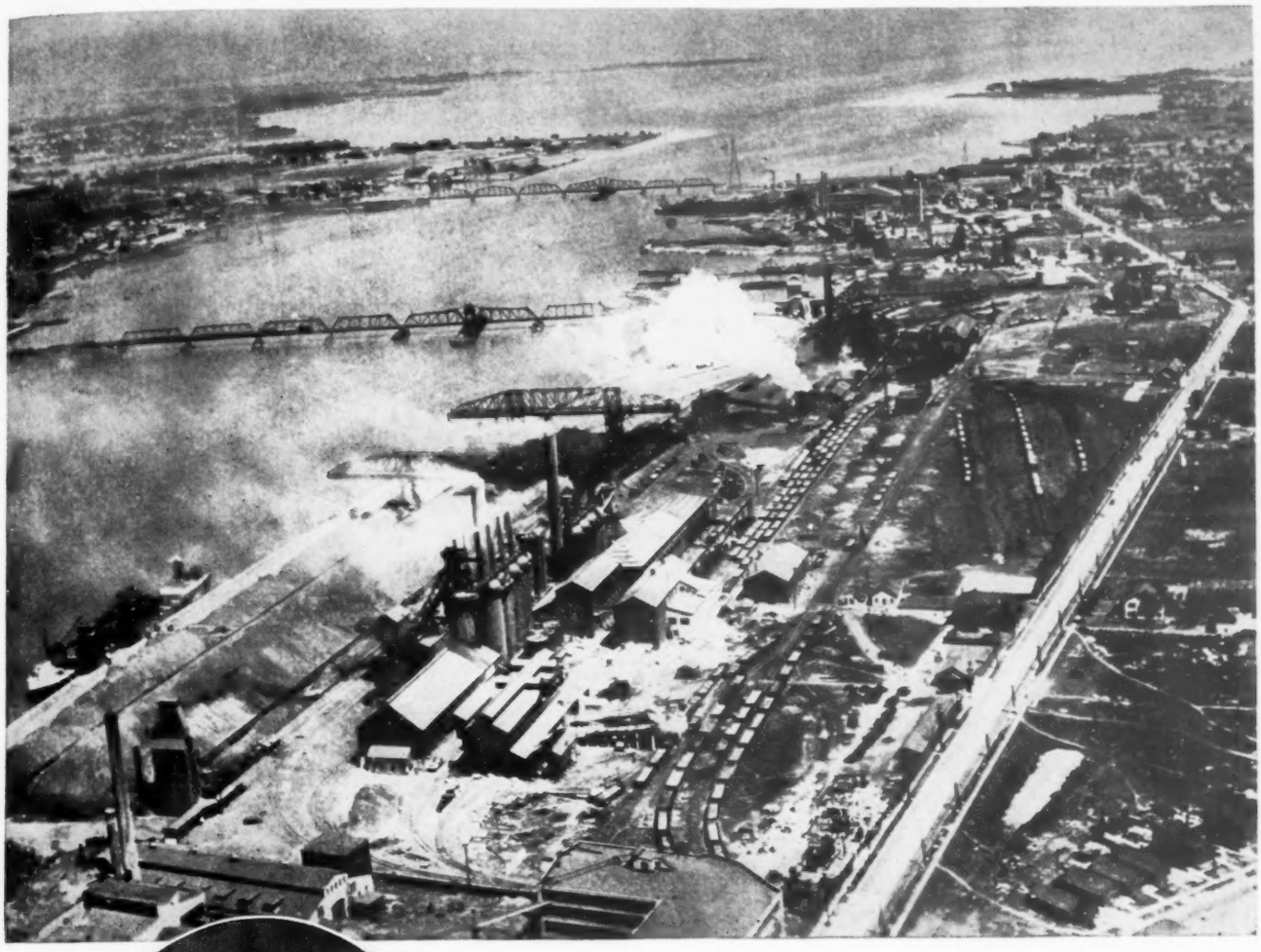
Covers Wide Surface Area

Temperatures now may be determined under working conditions by the radiation method and with sustained accuracy and permanence of calibration characteristics of potentiometer equipment by a recently developed portable potentiometer indi-



EFFECTIVE research and analysis, scientific control of production processes, ore reserves of wide range of chemical content, and adequate supplies of coal of proper analysis, combine to enable Interlake Iron Corporation to manufacture pig iron and coke to the most exacting specifications of the trade.

●

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FEDERAL PERRY TOLEDO ZENITH

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COKE . . *Foundry, Industrial and Domestic Uses*
CHICAGO SOLVAY PERRY TOLEDO ZENITH

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PIG IRON **PICKANDS MATHER & CO.** COKE
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cator. The detector element is sighted on the heated metal and responds to the temperature over a large area instead of to a localized temperature.

• • •

Earthen Blanket Effective

Diatomaceous earth now is being used as a covering for wire galvanizing pans to reduce the production of ash.

• • •

Trunnions Are Reclaimed

Recently a steel company departed from its previous practice of scrapping bessemer converter trunnions after they had become worn in service. The old practice entailed the installation of new trunnions. On this occasion the converter was raised and the trunnions lifted out of their bearings and their surfaces built up by arc welding. The built-up surfaces then were peened and rough-filed, making them sufficiently smooth to allow them to revolve slowly in their cast-iron bearings. Approximately 250 pounds of electrodes were used in resurfacing this pair of trunnions. The job was accomplished without removing the trunnions from the converter.

• • •

How Coating Is Applied

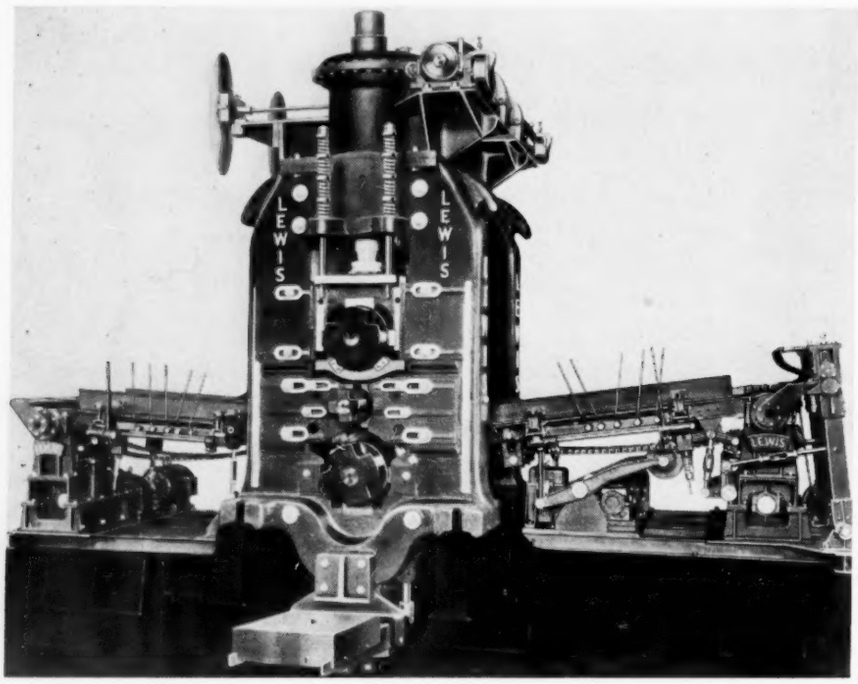
Various materials are used for coating the interior walls of ingot molds. When high-carbon ingots are to be poured, one steelmaker simply places a quantity of tar on the stool. Hot steel coming in contact with the tar causes it to ignite and give off sufficient soot to coat the sidewalls of the mold. At another plant a layer of ordinary tar paper is placed between the mold and its stool, this also supplying sufficient soot. At still another plant the interior of the molds is being sprayed with aluminum paint.

Develops 3-High Mill for Rolling Sheet Bars to Breakdown Sizes

MILLS of the 3-high type have been developed by the Lewis Foundry & Machine Co., Pittsburgh, and results have justified the changing of entire programs by sheet and tin mills, in connection with the rolling of sheet and tin bar to breakdowns and for the finishing of all types of sheets including full-finished sheets. With the use of the 3-high mill better gages can now be obtained and also production of a wide high-grade, full-finished sheet.

The 3-high mill, shown in the accompanying illustration, is designed with special control features of motor operated screwdown, top roll drive and balance for both top and middle roll, and with manipulating tables for handling bars and matched pairs, all of which are electrically and automatically controlled. This type mill, it is claimed, is the most efficient and economical unit for the class of work it is meant to roll.

The automatic screwdown, which now is being furnished with this 3-high mill, has duplex type control, providing close regulation of the mechanism which governs the various pass settings.



Balanced 3-high mill equipped with automatic screwdown to provide close regulation of pass settings

Output Is Augmented

Three-high mills with the automatic type of screwdown are able to increase production materially, if only from the standpoint of time saving in making the necessary adjustments for each pass.

One Lewis 3-high mill recently made a new record of 72½ tons of breakdowns in five of each consecutive 8-hour turns.

The Lewis company at present is constructing several 3-high mills for some of the largest foreign steel plants. Those which are complete with double motor operated screwdown are arranged for accurate adjustment of reduction on each pass and automatic balancing of top and middle rolls to prevent slapping of rolls when material enters.

Chemistry for the Busy Man in Many Fields

Handbook of Chemistry, by Norbert Adolph Lange; fabricoid, 1542 pages; published by the Handbook Publishers Co. Inc., Sandusky, O.; supplied by STEEL, Cleveland for $6, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London.

In editing this volume, an effort has been made to select material to meet the needs of chemists who cannot command the time available to the research specialist, or who lack facilities of the large technical library. Although the compilation is arranged primarily to meet the needs of the chemist, it is believed that workers in allied sciences will find abundant data of material interest and value.

Special features of interest are: Hazardous chemicals and their handling; changes in atomic weights, 1933 compared to 1894; a new mineral table; organic radicals, physical constants of organic compounds; a special selection of tables for water chemists, a table of alloys, including corrosion-resisting alloys; materials of construction, X-ray tables; and a workable index containing over 2500 listings.

New Checker Brick Increases Hot Blast Stove Efficiency

IN THE construction of a hot blast stove at the plant of a large steel producer in the East, special consideration was given to the conditions and requirements of the various zones in the checker chamber and the adaptation of the correct design of checker to suit these zones. This is important considering that the temperature of the gases in descending through the checker chambers decreases from about 2300 to 300 degrees Fahr., the velocity and the rate of heat transmission changing proportionately.

The stove is 89 feet to the top of the dome and 21 feet diameter. The checker chamber is 71 feet high and contains 100,000 square feet of surface including the combustion chamber but not the bottom. It is equipped with a patented open-joint checker brick developed by the William M. Bailey Co., Pittsburgh.

A special steel bottom for the stove was installed, in which the bars of steel are built alternately high and low, thus accomplishing a staggering of the checker columns from bottom to top of the checker chamber, as shown in Fig. 2.

Each checker, as will be noticed, is interlocked with adjoining checkers at all four corners, and each course of checkers is locked into the adjoining courses, eliminating shift or twist and the obstruction of the vertical flues.

This method of supporting and locking the checkers in the checker chamber has been obtained at only a slight sacrifice of surface. It also will be noted that the open joints not only interconnect all the flues, but expose 92 per cent of the side surfaces of the checker to the gases, thus affording a checker having an exceptionally large exposed surface. The open joints also equalize the flow of gas through the checker chamber, eliminating the possibility of secondary combustion in the bottom of the stove and making it impossible for the flow in any of the flues to be stopped for more than one checker length, should a flue become clogged at any one point.

Precludes Clogging of Flue

Checker "C", second from the bottom in Fig. 2, was selected for use in the lower 50 feet of the checker chamber because the dirt content in the gas made it advisable to use a fairly large flue to eliminate the possibility of all flues becoming clogged if at any future time failure of gas washing equipment should permit the dust to build up on the checker surfaces, so as to make it necessary to clean the flues. This checker, known as the "straight" type of checker because of its design, produces a 3-inch square flue with side passages. It has the advantage of giving a straight open flue which may be cleaned easily while at the same time it produces a structural strong checker with a large heating surface.

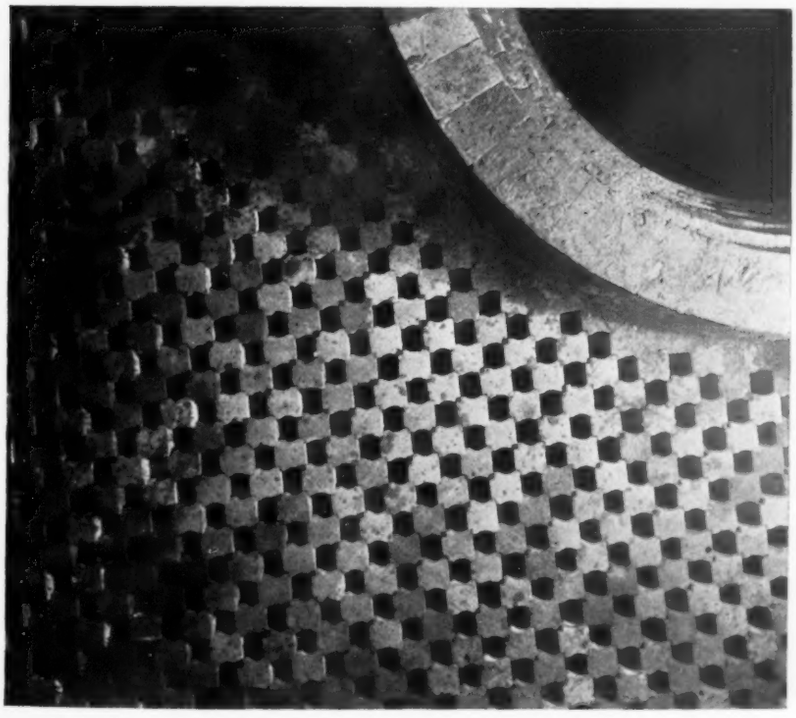


Fig. 1—Top section of checker brick before installation of the last course

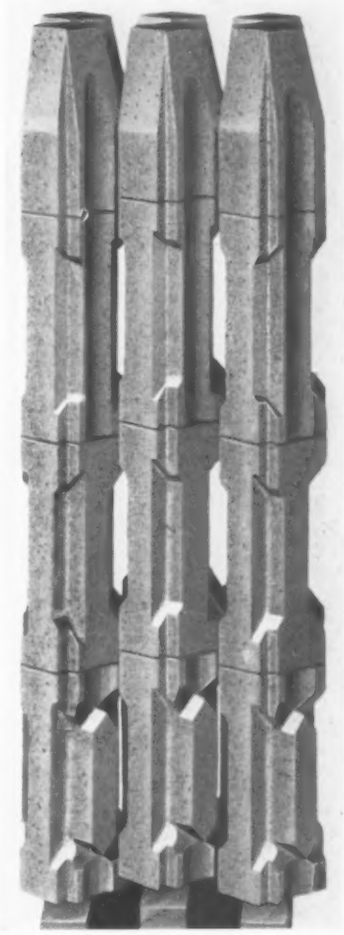


Fig. 2—Open joint checker brick for hot blast stoves

In analyzing the requirements of the top part of the checker chamber, it is known that this zone is subjected to a high temperature difference between brick and gas, radiated heat, and a turbulent gas, which makes the heat transmission rate high. For this reason, it is advantageous to have the greatest possible brick weight per cubic foot of checker chamber volume still providing ample surface considering length of heating period, in order to store a maximum amount of heat in this part of the stove. The top part of the checker chamber, therefore, was, lined with checker "B", (second from the top in Fig. 2) known as the "top" checker, which, besides providing great weight per square foot of surface, also has a larger flue area than the "straight" checker. The larger free area reduces the frictional resistance in this high velocity zone,

YOUR puzzles, questions, problems, if in the line of production or materials are always most welcome to our engineers. Again and again we have been allowed to assist manufacturers in such studies and frequently have proven helpful in offering practical suggestions on improvements or economies. Perhaps in all or only a part of your product, be it stamped, drawn or rolled, you will gain by considering American Quality Cold Rolled Strip Steel. Whatever your need, please consult us.

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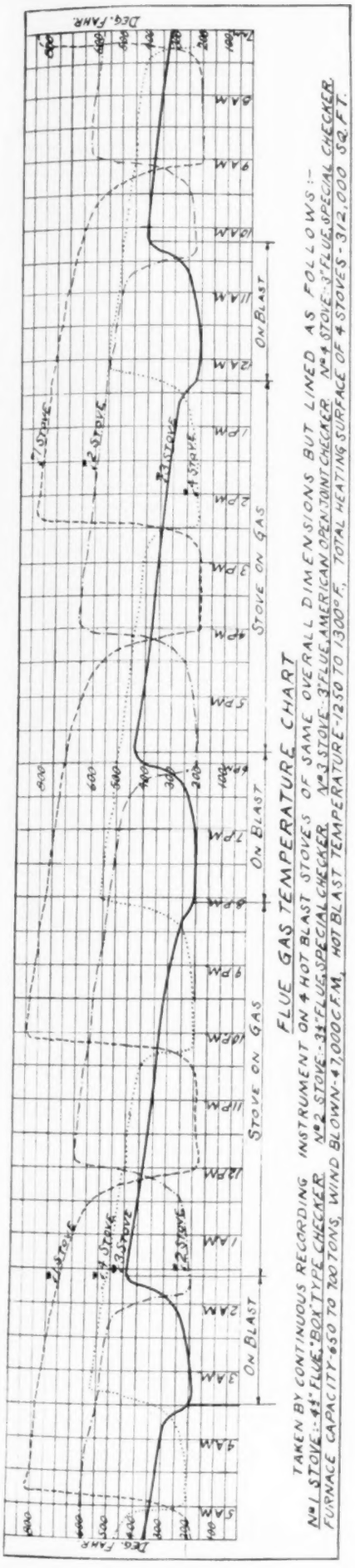
FLUE GAS TEMPERATURE CHART
TAKEN BY CONTINUOUS RECORDING INSTRUMENT ON 4 HOT BLAST STOVES OF SAME OVERALL DIMENSIONS BUT LINED AS FOLLOWS:-
No. 1 STOVE:-4½" FLUE "BOX" TYPE CHECKER No. 2 STOVE:-3½" FLUE SPECIAL CHECKER No. 3 STOVE:-3" FLUE AMERICAN OPEN JOINT CHECKER No. 4 STOVE:-3" FLUE SPECIAL CHECKER
FURNACE CAPACITY-650 TO 700 TONS, WIND BLOWN-47,000 C.F.M., HOT BLAST TEMPERATURE-1250 TO 1300°F., TOTAL HEATING SURFACE OF 4 STOVES-312,000 SQ. FT.
DEG. FAHR.
ON BLAST
STOVE ON GAS
4 STOVE
1 STOVE
2 STOVE
3 STOVE

and thus make it possible to burn a much greater volume of gas so as to take full advantage of all the surface provided even at low gas pressures.

Provides Easy Entrance

Checker "A", (top section in Fig. 2) known as the "inlet" checker, was used to top off the checker chamber. Its large free area, permits easy entrance of gases into the flues and the high temperatures at the top of the stove to be withstood without softening or spalling of the refractory.

Checker "D", (bottom section in Fig. 2) is used only where the gas

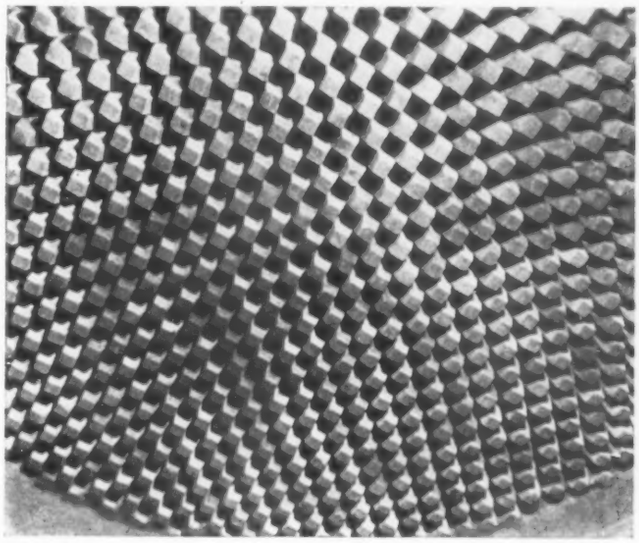

Fig. 3—Inlet checkers as viewed from the dome plug opening

burned is cleaned to 0.05 grains of dust per cubic foot or better.

The accompanying chart shows the actual recording of flue gas temperature taken by a 4-point continuous recording instrument on four blast furnace hot blast stoves, one of which is lined with American type open joint checkers. Besides this stove, the three others of the same size shell, are equipped with pressure burners of 7200 cubic feet per minute maximum capacity, burning an average of 6800 cubic feet per minute during normal operation of the furnace. Referring to the curves in this chart, showing the temperatures in the bottom of the stove or chimney, it will be noted that when No. 3 stove, having the 3-inch open joint checker, is on gas, the flue gas temperature increases gradually from a 200-degree Fahr. cold blast temperature to about 400 to 450 degrees Fahr. after a four-hour heating period. This means that the stack gas temperature increases about 50 degrees Fahr. per hour when burning 6800 cubic feet of gas per minute.

The temperature reading as shown by the chart indicates that the gas temperature in the bottom of stove No. 3 is as low as is desirable to go without dropping below the cold blast temperature of 200 degrees Fahr., the flue gas temperature being only 50 degrees Fahr. higher at the beginning of the heating period.

By the use of this type checker maximum surface for any given size of flue at minimum cost per square foot of heating surface, is obtained as well as complete cross-circulation or even distribution of the gas in all the checker flues in passing through the checker chamber. By having open joints inter-connect every checker with all adjoining flues, the flow in any flue never is stopped for more than one checker brick in case a flue becomes obstructed at any one point. Ample structural strength also is provided to resist vertical as well as horizontal crushing loads in checker chamber.

Movement Is Prevented

Shifting or twisting and obstruction of vertical flues is avoided by interlocking all checker brick with each other and each course. The weight of the brick is distributed in such a way that a maximum weight per cubic foot of checker chamber volume is given to the top portion of stove where the heat transferred is at a maximum rate because of the high temperature and turbulence of gas. The bottom portion also is given a maximum surface with a relatively small weight of brick per square foot, because of the small heat transfer per square foot of surface existing in this low temperature zone. The brick weight is distributed evenly behind all heating surfaces so as to insure uniform heating of each checker.

The first installation of these checkers was made in 1933 and the operation of the stove has been acclaimed highly efficient.

Mechanical Engineers Report Progress During Past Year

WHILE laboring under heavy handicaps, technology re-recorded progress during the past year, it was revealed at the fifty-fifth annual meeting of the American Society of Mechanical Engineers, in New York, Dec. 3-7. The depressed state of the durable goods industries; shortage in skilled help, resulting directly from five years of depression; and greatly reduced capital and cash reserves, retarding industrial expansion, have imposed a severe burden, but science and manufacturing technique have more than held their own, and in some lines, machine tools notably, an improved trend is pronounced.

More than 2000 engineers, industrialists and educators were attracted to the New York meeting this year, where more than 100 papers were presented at the various technical sessions. Of these sessions, a number were of direct interest to the iron and steel industry, with the Robert Henry Thurston lecture a feature. This lecture was presented by Dr. John Johnston, director of research, United States Steel Corp., New York, on the subject of "Some Applications of Science to the Making and Finishing of Steel."

THE country's economic problems came in for searching review when Dexter S. Kimball, dean of the college of engineering, Cornell university, Ithaca, N. Y., and a past president of the society, presented the Henry Robinson Towne lecture, the seventh in the series. The subject was "Prophets and Panaceas." He questioned how far the country could legislate itself into prosperity and declared that particular difficulty lies ahead when legislative enactments aim at changes or corrections in ethical code.

"If I have any criticism of the New Deal it is the apparent effort under the NRA to compel men to be just and fair. The intent is good, but the difficulties are great," he said. "It will require an immense police force to make any such enactment as the NRA effective."

The greatest asset that any nation can possess is the skill, knowledge and initiative of the industrial and business leaders, and probably, he added, the country can better afford to put a few of its too ambitious leaders in the penitentiary occasionally, rather than exterminate or suppress the entire group.

"In any case," Professor Kimball stated, "we are due to find out soon how far we can legislate ourselves into prosperity, or rather we shall find out perhaps, how far we may assist natural economic laws through legislation. And the experience may be trying for many of us."

On the whole, the speaker declared, the country has made much progress during the last century toward a more enlightened and fair industrial system, and its greatest hope lies not in legislation, but in higher ethical standards on the part of those who control industry, commerce and banking.

The Calvin W. Rice lecture was delivered by Dr. John H. Finley, editor of the *New York Times*, an address on the late Dr. Rice's contributions to international friendliness.

A. S. M. E. Elects Officers, Makes Medal Awards

RALPH E. FLANDERS, president, Jones & Lamson Machine Co., Springfield, Vt., was elected president of the American Society of Mechanical Engineers. *(See* STEEL, *Dec. 3, p. 17).* *New vice presidents elected were: James H. Herron, president, James H. Herron Co., Cleveland; Eugene H. O'Brien, editor, Southern Power Journal, Atlanta, Ga.; and Harry R. Westcott, president, Westcott & Mapes Inc., consulting engineers and architects, New Haven, Conn.*

Bennett M. Brigman, dean, Speed scientific school, University of Louisville, Louisville, Ky.; Jiles H. Haney, professor of mechanical engineering, University of Nebraska, Lincoln, Nebr.; and Alfred Iddles, vice president, United Engineers & Constructors Inc., Philadelphia, were added to the board of managers.

The A.S.M.E. medal for 1934 *was awarded to Willis H. Carrier, chairman, Carrier Engineering Corp., Newark, N. J., in recognition of his research and development work in air conditioning.* *(See p. 23).* *President Flanders received the Worcester Reed Warner gold medal for his contribution to a better understanding of the relationship of the engineer to economic problems and social trends. Philip P. Self, Port Collins, Colo., was given the Charles T. Main award for a paper on air conditioning.*

Honorary memberships were conferred upon Dr. William F. Durand, professor emeritus of mechanical engineering, Leland Stanford university, Palo Alto, Calif., and Dr. David S. Jacobus, head of engineering department, Babcock & Wilcox Co., New York.

IN THE Thurston lecture, Dr. Johnston declared that the number of steel compositions now being specified and used is far greater than really required and that he believed consumers, as well as producers, would benefit considerably by a reduction in this number, as better steel would result if it were possible to turn out more tonnage of a single specification in a continuous operation.

Systematic scientific investigation, Dr. Johnston said, is leading to a better control of the processes involved in the making and finishing of steel and thus to a better and more uniform product. This improved uniformity is a matter not so much of closely limited proportions commonly specialized and analyzed for, as of control over the more elusive things, which influence the useful behavior of the finished steel by affecting, for instance, the grain size of the solid steel.

Service Test Only Real Gage

Better knowledge and control of these factors, he stated, leads in turn to a better ability to select the steel best suited for a specified purpose, and to the conclusion that too many compositions are now being specified and that at least some of the acceptance tests commonly imposed on steel are less significant indications of its quality and fitness than is generally assumed. The service test should be the final criterion.

He also believed that in many cases too much emphasis was placed on whether steel was made by the bessemer or open-hearth process. Either process may serve satisfactorily for certain applications, providing operating conditions are right, especially for finishing. He remarked, incidentally, that no two steelmakers produce steel in precisely the same way.

LIVELY discussion as to the relative merits of welded steel forms and cast iron, particularly as applied to machine tools, indicated that considerable progress has been made by welded steel but that cast iron retained preference for various major elements in machine tool design, especially where quantities of a single type are involved.

Sol Einstein, Cincinnati Grinders Inc., Cincinnati, in presenting a paper said that at his plant welded structures are used largely in jigs and fixtures, and emphasized in this connection the rapid speed of delivery made possible. For special machines welded forms are usually preferable. For semispecial machines, produced also

FRONT PAGE NEWS FOR METAL USERS

What's Going On in the Nickel Alloy World—The New Economies—The New Equipment—The New Records for Dependability and Long Machinery Life—Read the Story Month by Month in "Nickel Steel Topics" and "Nickel Cast Iron News"—Sample copies on request

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Heat Treatment Wid
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OCTOBER, 1934
Metal Men Gather for Annual Congress
Nickel Steel Topic
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Boulder Dam Cableway Has Capacity of 150 Tons
Cyclone Engines
Nickel Steel Topics
Nickel Alloy Steels

NICKEL CAST IRON NEWS

In November Issue

1. Life of Coke Crusher Rolls Increased 6 Times by Use of "Ni-Hard" Iron.
2. Largest Municipal Power Plant Uses Giant Diesel Engines with Nickel Cast Iron Parts.
3. New Jack for Knee-Action Automobiles Built Largely of Nickel Cast Iron.
4. 50,000 Miles of Trouble-Free Marine Service is Record of Nickel Iron Cylinders and Pistons in Unaflow Type Engines.
5. Alloy Iron in Air-Conditioning Equipment.
6. "Pancake" Engine Developed for Increasing Capacity of Buses, Makes Large Use of Alloy Cast Irons.

NICKEL STEEL TOPICS

In December Issue

1. Welded Nickel Steel Vessels for Low Temperature Oil Refining Operation.
2. "Rainbow" and "Endeavour" Mast Braces Made Stronger and Lighter by Use of Nickel Chromium Steel.
3. New Nickel Molybdenum Steel for Bakelite Molds.
4. 24-Wheeled Vehicle Built in England to Travel Over Darkest Africa Uses Nickel Steels in Vital Parts.
5. Weldless Steel Chains Made by Special Mill with Rolls of Nickel Alloy Steel.
6. Paper Mill Effects Important Savings Using 3½% Nickel Steel Rolls.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

Miners, refiners and rollers of Nickel. Sole producers of Monel Metal.

in small quantities, they would be put to serious difficulty in deciding which metal to use. As a general rule, however, he believed that if five or more were to be built cast iron probably would be used and that if the number were to fall below three, welded forms would be employed. He also said that he could see a field for welding in the production field of machine tools, where it pays to make templets and where adequate welding machinery is available.

Mr. Einstein remarked that there is a considerable trend toward using welded structures on shears, brakes and punch presses. Electrical equipment uses welded members to a large extent, he said.

Everett Chapman, vice president, Lukenweld Inc., division of Lukens Steel Co., Coatesville, Pa., who presented an exhaustive paper, compared the properties of steel and cast iron, discussed the properties in terms of structure, and commented on stress distribution, the elastic and plastic action of the materials and vibration.

Offers New Shapes

He outlined progress in the welding science, illustrating his remarks with numerous lantern slides and noted increasingly new applications of welded structures. Mr. Chapman said that welded steel now made predictable structures possible for the machine tool builder and that it offered new shapes which the builder had never had before. He inferred that once the machine tool business again reaches a point where quantity production becomes the rule, that once the possibilities of welded steel are fully realized by tool designers, a marked spurt in the application of welded forms will be evidenced.

Answering statements as to the higher cost of welded steel, as compared with cast iron, he remarked that if machine tool builders were to consider the heavy capital investment which many have in patterns for castings, they would find that the difference in cost factors would shrink appreciably.

Discussing modern weld metal, Mr. Chapman commented on its excellent physical properties and said that the commercial existence of such a metal together with the fact that it can be used to integrate rolled steel has several important implications for the designers of structures and the makers of steel. The freedom of welded design inherently implies the ideal structure, with its smooth flowing contours and its homogeneous, elastic properties. That such material can be produced, he said, is an incentive to both the maker and the designer of structures to reduce, perhaps eliminate, the number of damaging discontinuities in their steels and structures.

Mr. Einstein, in commenting on the question of whether to use a cast or welded structure, said that the average machine shop to date has little or no experience in welding. The majority of the designers if asked to design a welded structure incorporate in it the experiences and ideas which they have had on cast iron. Thus, he remarked, the advantages of the welded structure over cast structure are often greatly minimized.

Welded structures in general are lighter in weight, have greater strength proportional to their weight, enable quicker delivery, and result frequently in more stable structures. Theoretically, Mr. Einstein said, the cost of such parts, if they are made singly, is cheaper; and under certain conditions the cost of parts manufactured in large quantities with elaborate tooling might be cheaper. Cost of patterns is eliminated for welded structures, but the necessity for templets or other auxiliary tools reduces this saving.

The disadvantage of the welded structure, as Mr. Einstein regarded it, is the greater possibility of vibration. The cast structure, he said, dampens vibration, while the welding structure may resonate. The welded structure on a medium sized production job results in higher costs, and this is particularly so, he said, when cast iron or hardened steel ways have to be attached to such a structure for sliding surfaces. To reduce internal strains, welded structures often have to be annealed, at additional cost. The speaker believed also that the welded structure does not lend itself so readily to the production of pleasing lines and contours.

New Trends in Equipment Design Seen at Power Show

INCREASING use of alloy steels in power plant equipment, transmission and mechanical units employed by the power industry was amply demonstrated at the eleventh national exposition of power and mechanical engineering at Grand Central Palace, New York, Dec. 3-8. Definitely new steels or alloy steel entering into such equipment as displayed by approximately 200 exhibitors, were few. Greater use of nickel steel with a variable chromium content for power transmission by chain drives was noteworthy.

Bearing Assemblies Improved

Engineering progress in ball and roller bearing assemblies for heavy-duty service has also been an outstanding development since the last power exposition. Greater use of steel for refrigeration and insulation was also evident as a result of a survey of the exhibits. Power-saving features, widely stressed, frequently require the employment of special alloy steels and castings.

Exhibits were fewer in number than at several shows in other years, but the attendance was high, the annual meeting of the American Society of Mechanical Engineers being held concurrently.

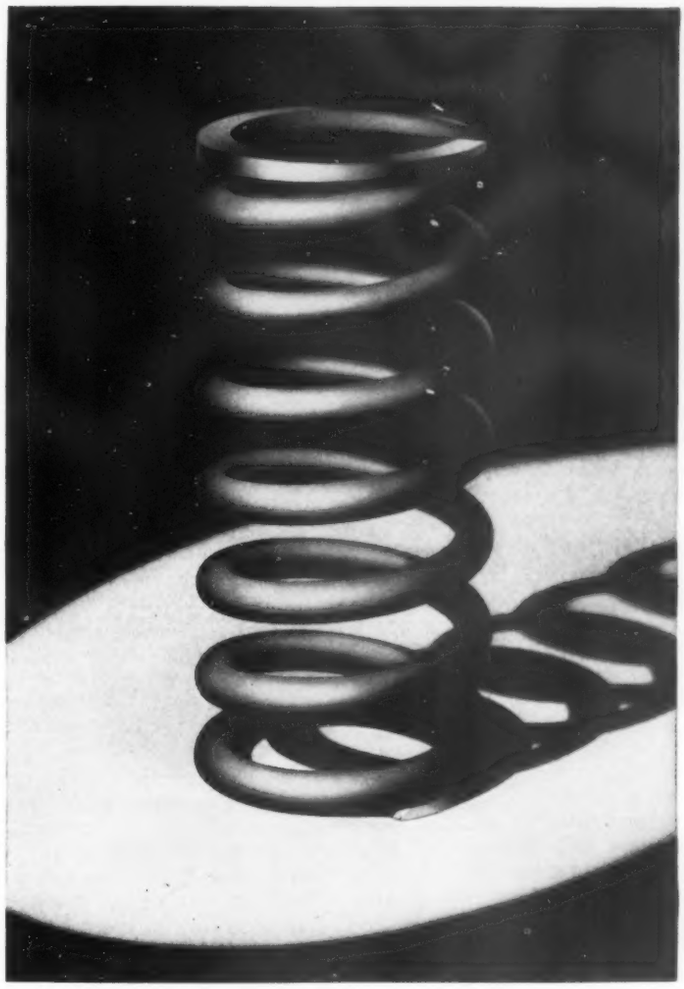
Among the more spectacular exhibits was a "talking" beam of light displayed by the General Electric Co., Schenectady, N. Y. This beam transmitted sound a distance of 46 feet; in experiments, however, the beam has operated at a distance of 46 miles. At the power show a phonograph was started and the record's music was transmitted through an amplifier, then to a neon crater lamp, being transformed from sound into light. The lamp flashed this to a paraboloid mirror on a photoelectric cell, a few inches distant. The beam, in turn, was transformed into sound again. A person or object intercepting the beam of light at any point stopped the music.

When the new Union Pacific streamlined train recently approached Schenectady, the engineer, with a similar apparatus, used the locomotive headlight as a beam to announce his arrival at Schenectady in his own voice. This was done two minutes before pulling into the station on a straight stretch of railroad track.

Hundreds of new or improved devices and processes were offered, including electrical apparatus, steam plant apparatus, air conditioning and refrigeration systems, dust separators, fan blowers, furnace vacuum cleaners, sprayers, ventilating systems, diesel engines, safety equipment, oil testing apparatus and recording instruments.

A MINIATURE blooming mill, built to scale, was operated by the Jones & Laughlin Steel Corp., Pittsburgh, the various developments in steelmaking from ingot to billet being graphically shown. This company also displayed an extensive line

In Selecting A Steel For Coil Springs,
Bear In Mind –



The problem in selecting a steel is to choose one that will enable the manufacturer to duplicate the results desired thousands and thousands of times with regularity and a minimum of effort and cost.

Its demonstrated melt to melt uniformity and its conceded freedom from sensitivity make Silicon-Vanadium the ideal analysis for coil springs of many types.

Metallurgists of the Vanadium Corporation, familiar with the difficulties of spring design and manufacture, will be glad to co-operate with you.

VANADIUM CORPORATION OF AMERICA
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FERRO-ALLOYS
of vanadium, silicon, chromium, titanium, and silico-manganese, produced by the Vanadium Corporation of America, are used by steel makers in the production of high-quality steels.

VANADIUM STEELS
for strength, toughness and durability

of piping used in power, heating and refrigeration installations, including intricate bends, coils, joints, high-pressure steam pipe, circle expansion seamless bends and crossover bends.

High-speed tool steels, special alloy steels for knives and saws, and high-speed tool bits were included among the products of the Henry Disston & Sons, Philadelphia. Working exhibits included a wood shaper operating at two speeds and a demonstration of proper sharpening of metal cutting saws, the latter being equipped with interlocking-wedged teeth of high-speed steel.

Lebanon Steel Foundry, Lebanon, Pa., featured electric steel castings in many sizes for oil, water, power, chemical and general industrial plant equipment. Castings were of stainless and carbon steels, medium manganese and chromium-molybdenum, and included valves, pumps, fittings, crankshafts and rock drill castings.

A uniform scale chart with forged steel chamber, there being six small, but intricate forgings in the chamber of the unit, was featured by the Foxboro Co., Foxboro, Mass., builder of precision instruments. Temperature, pressure and steam flow is registered simultaneously on the same chart and the instrument is especially adaptable to the registering of records in high-pressure and temperature operations.

Special Pipe Displayed

Cement-lined pipe—standard steel pipe lined with a low soluable cement for carrying corrosive water—was featured in an extensive display of pipe by the National Tube Co., Pittsburgh. The cement is applied by a centrifugal process and the pipe adaptable to water lines and industrial uses. A quick drying threading dope, sealing the end of the pipe and threads in fittings against corrosive action was also featured. Other products included the Wallace joint for lightweight tubing, especially suitable to the dairy industry, high-pressure power piping, stainless and heat-resisting pipe and tubes, seamless and power piping.

Crystolon brick for boiler furnace walls, power plant refractories and refractory brick in various sizes of silicon carbide were shown by the Norton Co., Worcester, Mass. The company also featured a display of boron carbide, a comparatively new product developed by the company for abrasives, pressure nozzles and other uses requiring an ultra-hard material.

Youngstown Sheet & Tube Co., Youngstown, O., operated a working model of a two-high automatic sheet mill and, as a background for its display, steel mill scenes depicting the making of steel from ore to finished product were shown. An unusual attraction was a section of 6¼-inch steel casing, part of 698 feet, removed from an oil well near New Middletown, O., after 21 years service. This casing revealed but slight corrosion, the mill scale still being plainly noted, and the casing was less corroded than the iron fitting. The remainder of the casing was sold again for further service in a well near Homeworth, O.

BEARINGS, both ball and roller from ⅛-inch to 30-inch bore, were shown by the Norma-Hoffmann Bearings Corp. Metal sealed, double felt sealed, suitable for loose and idle pulleys, grinder and precision instrument bearings were also featured. For high-speed spindle work, a bearing with composition cage was shown.

A roller chain flexible coupling, allowing for fluctuations on the shaft up to three degrees was featured by the Baldwin-Duckworth Chain Corp., Springfield and Worcester, Mass. A composite board showing a wide variety of chain and sprockets in many sizes for power transmission was also displayed.

Fafnir Bearing Co, New Britain, Conn., displayed an extensive exhibit of bearings for high speed, pressure and power transmission, including sealed bearings. Special double-cage assemblies of large bore bearings designed especially for heavy and high speed work with a minimum of friction and with power and lubrication-saving features were notable. A complete line of heavy duty industrial roller bearings, designed for severe loads, was also included.

Link-Belt Co., Indianapolis, stressing power saving and smoothness in operation, showed a number of power transmission drives, including silent chain, roller, gear and variable roller drives. Herringbone gear speed reducers and motorized speed reducers were included.

Sheet Steel for Insulation

Use of commercial black steel sheets as an insulating material on refrigerator trucks, ships, railroad cars, baking ovens, cold storage buildings and frame dwelling walls was demonstrated by the American Flange & Mfg. Co. Inc., New York. This type of insulation consists of parallel spaced metallic sheets with dull surfaces, having low emission and high reflection values at the frequencies of radiant heat. Black sheets as light as No. 30 gage are formed with angularly arranged surfaces with small ribs at the joints, securing rigidity, vibration elimination and prevention of propagation of sound waves. Number of sheets used in a wall or around a pipe depends on the temperature difference and the heat conductivity desired. Spacings between sheets are based on the results of experiments to determine the arrangement best suited to eliminate turbulent air flow, at the same time providing highest thermal-insulating value.

A complete line of heavy duty ball and roller bearing pillow blocks, ball and roller bearings, and ball bearing hangers was displayed by S.K.F. Industries Inc., Philadelphia.

SOME new features in materials handling equipment were displayed by the Philadelphia division of Yale & Towne Mfg. Co., including a new rail chain hoist for close headroom service. The hoist is being offered in sizes ranging from 1½ to 10 tons capacity. An electric industrial truck was also shown, equipped with a new tilting fork which not only has a lifting but tilting action.

Also displayed was a new tin plate lift truck, which has a pair of articulated rear wheels which automatically raise the lower frame when the load is elevated, thus facilitating free movement in and out of freight cars and motor trucks where inclined ramps are used. Hand lift trucks having a lifting radius of 360 degrees and a selective lift which enables the operator to choose the lifting handle position that best suits his height and to make numerous short strokes or a few long strokes to elevate the load, as desired.

Features Alloy Castings

A nickel-copper-chromium cast iron and an especially hard abrasive and wear-resisting cast iron were among the features of the exhibit of the International Nickel Co. Inc., New York. Chrome-nickel steel castings and S.A.E. nickel steels were also shown, along with an exhibit of monel metal.

Latest developments in the company's welding equipment were exhibited by the General Electric Co., which also demonstrated, in addition to a line of gear motors, a new thrustor which gives straight motion, and also a new motor mounted disk break.

The refractories division of the Carborundum Co., Perth Amboy, N. J., featured applications of its silicon carbide refractory for boiler work. A line of refractory cements also was shown. Keystone Refractories Co., New York, displayed a monolithic refractory for furnace lining and maintenance; also firebrick cements. Harbison-Walker Refractories Co., Pittsburgh, also had an interesting display of its various refractory materials.

At the booth of the Republic Flow Meters Co. and the Smoot Engineering Corp., Chicago, a new regulator for industrial boilers was shown. The regulator may be operated by either

(*Please turn to Page* 60)

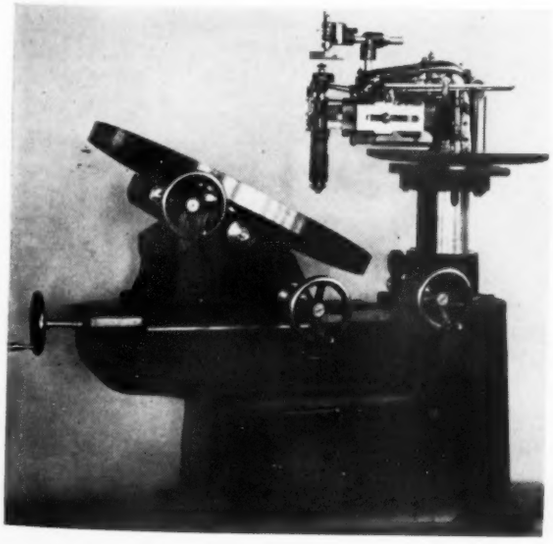
NEW EQUIPMENT

PRODUCTION FABRICATION
TREATMENT FINISHING

Three - Dimensional Diesinking, Profiling, Engraving Unit — Marquette Machine Co., 4256 Jackson boulevard, Chicago, now is offering in addition to the recently announced electrically automatic controlled No. H-3 unit, or the No. H-3 manually operated three-dimensional universal pantograph machine, a No. H-3a, three-dimensional pantograph machine which is especially designed for deep and heavy molds for the synthetic plastic products industry, as well as for the die casting and the rubber industries. Both the No. H-3 and H-3a are suitable for the use of soft paterns or masters, made of plaster, etc. The No. H-3a, shown herewith, can also be arranged for electrically automatic control, if desired, equipped with an electrical tracer system, which operates through a volume system similar to a radio tube system. Reversing type of motors are used.

The automatic control system is simplified, and no motor generator is required. The No. H-3 or H-3 machine should prove especially profitable to those engaged in the diecast mold, bakelite mold, and rubber mold industries. Both machines copy direct from a 1-1 ratio master or template, and reductions from 2-1 to 12-1 can be obtained. Reductions to 30-1 also can be obtained with a special machine.

Pattern-table, located on the right side of the machine, can be adjusted by a feed screw vertically 12 inches, thus facilitating the use of high masters or patterns. Cutter capacity ranges from ⅛ to ⅜ inches straight shank cutters; taper-shank cutters also can be used. All lead screws are reading in 0.001-inch. Jobs up to 20 x 7 inches can be profiled on the No. H-3a in a ratio of 1-1. The Marquette Machine Co. will be located in Toledo, O., after Jan. 1.



Marquette No. H-3a universal three-dimensional pantograph diesinking, profiling and engraving machine

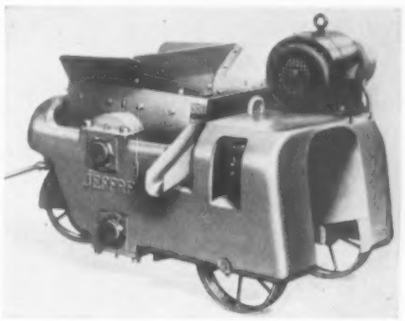
♦ ♦ ♦

Drum and Barrel Rack—Barrett-Cravens Co., 3255 West Thirtieth street, Chicago, has placed on the market a rack that enables one man to place drums and barrels into a convenient position for draining. The "Rockerack," as it is called, employs a new principle of tilting and lifting, according to the manufacturers. Toes instead of flat bars are placed under the drum. Consequently in tilting the barrel it does not become necessary to actually lift it until it is away over on its side. In that position, the weight of the barrel itself does much to accomplish lifting it on the rack, shown herewith. It is made in two styles: Model 18—the plain type without casters and model 18W—equipped with casters. Both types are capable of handling of kinds of barrels and drums from 30 to 55 gallons.

Barrett-Cravens "Rockerack"

♦ ♦ ♦

Portable Sand Conditioner — Jeffrey Mfg. Co., Columbus, O., recently developed a portable sand conditioner for foundry use. The unit, shown herewith, has a capacity ranging from 10 to 15 tons per hour. In this machine the sand is thoroughly screened and separated from refuse such as nails, rods, gaggers, bits or core, etc. Refuse is deposited in a pile at the side of the unit. The machine thoroughly cools, blends and aerates the sand through the Jeffrey principle of aeration.

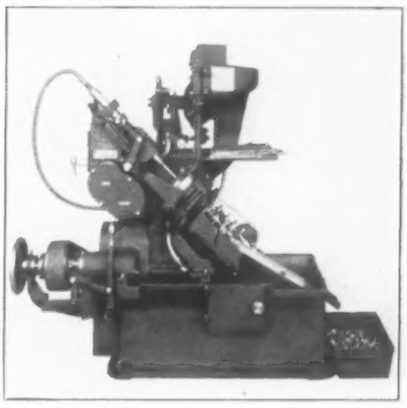


Portable sand conditioner developed by Jeffrey Mfg. Co.

Bond is not destroyed and the sand is thrown into fluffy windrows or piles, ready for use. Other features are low shoveling height, the distance being only 26 inches above floor level. Push button control is provided and all moving parts are fully protected. One V-belt from motor drive the entire machine.

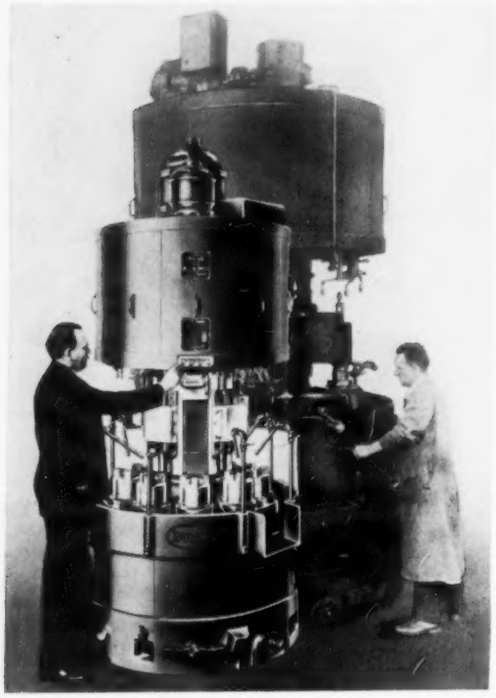
♦ ♦ ♦

Full Automatic Nut Tapping Machine—Acme Pattern & Machine Co. Inc., 1559 Niagara street, Buffalo, recently brought out a full automatic straight shank precision nut tapping machine. The unit, designated No. 2, is built with a hopper feed of rotary disk type, specially designed to prevent clogging. It employs a 15-inch straight shank tap of standard design and is capable of producing threads of all classes of fit, governed only by the accuracy of the tap used. The machine will tap nuts from ⅜-24 to ⅞-14 hex.; ⅜-16 to ¾-10 hex. or ⅜-16 to ¾-10 square.



Nut tapping machine designed by Acme Pattern & Machine Co.

The unit, shown herewith, is driven by a single pulley mounted on a



Bullard Mult-Au-Matic for small work

single disk clutch in conjunction with an automatic throw-out connected to the tapping spindle. As a further protection, another throw-out is connected with the tap holding mechanism. Both throw-outs are operated through a solenoid having a connection with the clutch. Tapping spindle is set at a downward 45-degree angle and employs gravity to expel the tapped nut. Where the grade of steel is apt to cause clogging because of the nature of the chips produced, an auxiliary sweeping device is arranged to insure the cleaning of the tap shank.

♦ ♦ ♦

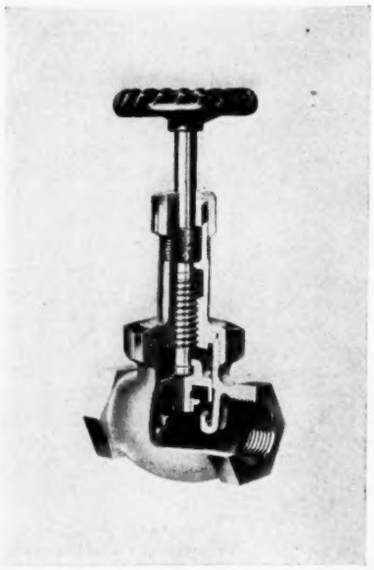
Mult - Au - Matics — Bullard Co., Bridgeport, Conn., is announcing a new line of Mult-Au-Matics known as the "J" series. This new type of unit, shown in the illustration directly above, is characterized by flexibility, automaticity and mobility.

Series "J" Mult-Au-Matics are designed for the field of small high-speed work, and while the two machines, "J-7" and "J-11," offer all of the advantages of the larger machines, they also have many added features not heretofore available.

The electrification affords three push button control stations conveniently located for greatest ease and safety of tool setting as well as machine operation. As shown herewith, each control unit has four separate buttons, one for emergency control which stops all functions; a second for starting the main drive motor; a third for head traverse advance; and a fourth for head traverse return. The head traverse advance and return is operated from a small separate motor installed for this purpose only.

Eight spindles allow one station for chucking and seven stations for work with speeds independently variable to meet the requirements at any station. An especially wide range of speeds is obtainable on both "J-7" and "J-11." The initial range of the smaller machine runs in 41 changes from 168 to 1509 revolutions per minute. For "J-11," the initial range in 41 changes runs from 84 to 754 revolutions per minute. In addition to these changes and by means of a dual range change feature, it is possible to obtain a blanket 2 to 1 reduction of all spindles.

The seven feed works operate individually and independently for each work station. Adjustments are provided so that short or long feed strokes may be obtained. These adjustments permit setting for short feed with almost instantaneous return of heads to neutral position at end of feed stroke. Total maximum stroke is 10 inches. This combines traverse and feed which, within certain limits, may be divided into various combination to suit work specifications. The limiting factors of traverse and feed are the minimum traverse stroke of 1⅜ inches and the minimum feed stroke of ¼-inch.



All parts of Fairbanks globe and angle valves are interchangeable

♦ ♦ ♦

Globe and Angle Valves — Fairbanks Co., New York, recently placed on the market a new line of renewable bronze angle and globe valves. A cutaway view of one of the valves is shown herewith. A radial seat between the body and the bonnet insures a tight joint and alignment of all parts. This seat is drawn to a tight joint by the union nut without sliding or scraping the surface of the seat, thereby increasing the life of the valve.

The disk ring not only serves efficiently in the control of the steam but also on hot and cold water. It is composed of long-fibre asbestos, compounded with vulcanizing elements. Disk holder is of standard dimensions, permitting the use of other standard makes of disk rings if desired. The stem is of rolled rod bronze, averaging 65,000 pounds tensile strength.

♦ ♦ ♦

Unit Heater—Modine Mfg. Co., Racine, Wis., is bringing out a unit heater, shown herewith, of the suspended, propeller fan type. The unit takes up no valuable floor or wall space but is suspended directly from the steam line above. Instead of wastefully overheating ceilings and walls, heat is delivered downward to the working level where it is needed, it is claimed. Floors and working zones are evenly and healthfully heated. No brackets, pipe rods or straps are required, the supply connection being the only support needed. This direct suspension, which also simplifies relocation, is combined with 360 degree rotatability.

Modine unit heaters are made in sixteen steam and fourteen hot water sizes

♦ ♦ ♦

Insulated Electrode Holder—Jackson Electrode Holder Co., 174 Chal-

mers avenue, Detroit, recently brought out a new insulated electrode holder recommended as a means for eliminating flashes. Injuries to light work, due to accidental grounding, also are avoided, so that the safety factor as an advantage is matched by the elimination of spoiled work. Avoidance of breaking the arc through striking an uninsulated holder against grounded parts while welding naturally increases welding speed. The holder, shown herewith, is made of a special alloy having unusual

Jackson insulated electrode holder provides a means for eliminating flashes

strength, wear-resisting qualities and high conductivity. It is said to have two or three times the useful life of a bare type holder. Cable connection may be clamped or soldered. Handle and jaws are protected by molded, nonconductive, nonburnable insulating parts, securely attached.

♦ ♦ ♦

Lubricating Device — Lubrication Products Co., Burgettstown, Pa., with general offices in Cleveland, recently announced a self-contained lubrication unit for all types of journal boxes. The company claims it eliminates the need for waste packing. The device is designed with positive spring action. This, together with capillary attraction introduced by its wool felt pad, applies lubrication throughout the length of the bearing, without loss of oil and without excess oil in the journal box. The unit has been given a two and one-half year try-out in the journal boxes of overhead cranes where it has lowered costs, and completely eliminated the dripping of oil onto products below, according to the manufacturer.

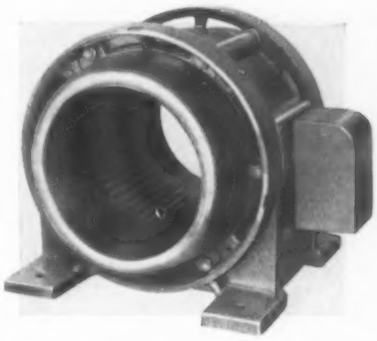
♦ ♦ ♦

Grinding Wheels — Carborundum Co., Niagara Falls, N. Y., recently introduced a new development which was designed especially for shaping and conditioning hard cemented carbides such as tungsten and tantalum carbides used extensively in turning and borings tools. It is the diamond impregnated grinding wheels made in three grits, namely 90, 220 and 400 grit which respectively are termed coarse, fine and extra fine. The coarse or 90 grit wheel is for rough grinding or stock removing, the fine or 220 grit wheel for obtaining a fine edge, and the extra fine or 400 grit wheel for creating an exceedingly keen edge and mirror finish.

Since solid wheels with diamonds as the abrasive would be prohibitive in cost, a composition form or backing was devised, and a coating of the diamonds and bond about one-eighth inch thick is applied to the side of the wheel form for side grinding, and to the periphery of the wheel form for cylindrical grinding etc. At present the wheels are available in 6 and 7-inch diameters in both types of wheels, and in all grits mentioned.

♦ ♦ ♦

Motors—Allis-Chalmers Mfg. Co., Milwaukee, is bringing out new "seal-clad" squirrel-cage motors of open type construction, with permanent coil protection. Hard, smooth, bakelite shields are sealed over the stator coils giving protection against metallic dust, grit, oil, moisture, mild acids and other agents injurious to insulation. These units, one of which is shown herewith, are built in ratings up to 25 hp. 1800 revolutions per minute and have cast steel frames; twistless and distortionless stators; silver-brazed, indestructible rotors; oil and dust-tight sleeve or antifriction bearings.

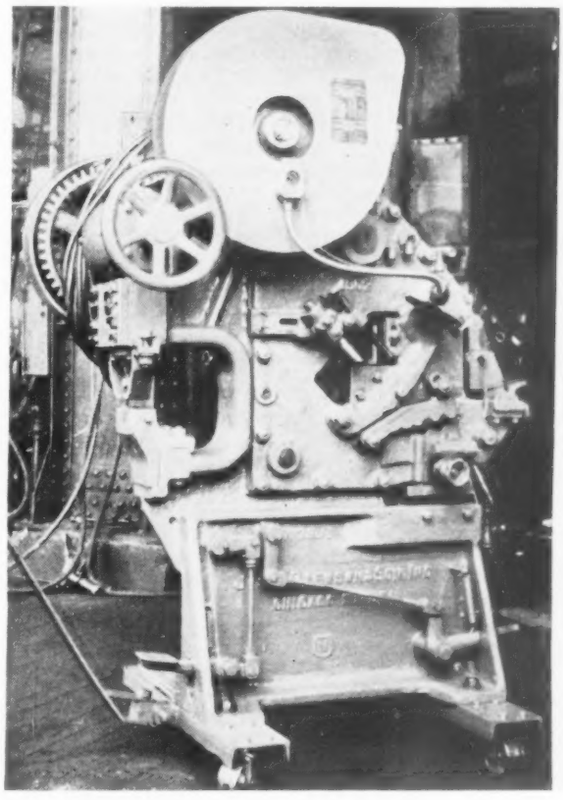


Permanent coil protection features Allis-Chalmers motors

♦ ♦ ♦

Combination Shear, Punch and Coper — Joseph T. Ryerson & Son Inc., Chicago, recently introduced a portable combination shear, punch and coper. This machine, shown herewith, has all the standard features of the cast steel combination machines which the company has been selling for several years. To better meet requirements in certain fields, a ball bearing caster and steel channel mounting has been arranged so that the machine can be pulled easily anywhere about the shop.

A 50-foot extension cable provides motor connection to most any location and an extension lamp assures proper working light in dark places. The handle for pulling the machine can be quickly connected at either end so that it is not even necessary to turn the machine completely around to run it in the opposite direction. The machine handles punching, plate and bar shearing, angle and tee cutting, angle mitering, coping and notching and can be furnished in various sizes and capacities.



Portable combination shear, punch and coper recently introduced by Joseph T. Ryerson & Son Inc. A handle is supplied for pulling the machine about

New Trends in Equipment Design Seen at Power Show

(*Concluded from Page* 56)

oil or water pressure and is equipped with a built-in relay cylinder for producing power. A new mechanical flowmeter and a multiple indicator were among other features of the wide line of instruments.

A new impact hardness tester was demonstrated by the Tinius Olsen Testing Machine Co., Philadelphia. It provides direct reading, permits a constant load on the specimen at all times, even before contact is made, and is electrically operated. Also featured was a universal testing machine which provides both constant rate of strain and constant rate of stress and plots the curve at the same time. It employs the lever-type pendulum system and has features which may also be used on hydraulic weighing units.

Show Midget Steam Engine

Prominent in the display of the Brown Instrument Co., Philadelphia, were mechanical and electrical types of flowmeters; also an electric CO_2 meter for flue gas measurement. A novelty of the Brown exhibit was the operation of what is said to be probably the smallest steam engine ever constructed. It measured 2½ by 1½ inches, with the flywheel being less than 1 inch in diameter, and was of a horizontal reciprocating type.

The Bailey Meter Co., Cleveland, exhibited a new boiler meter of simplified design, having a direct reading escapement type integrator, among other features. The Reeves Pulley Co., Columbus, Ind., exhibiting a full line of variable-speed equipment, demonstrated a new hydraulic automatic control, giving speeds in micrometric increments. The Bristol Co., Bristol, Conn., displayed a flowmeter, equipped with a new pressure compensator; also a new electric flowmeter.

The Jeffery-Traylor division of the Jeffery Mfg. Co., Columbus, O., demonstrated a line of electric vibrating feeders, including a new vibrating hopper and a line of water jacket feeders for high temperature furnaces.

One of several features of the exhibit of the Leeds & Northrup Co., Philadelphia, was a device for recording continuously and automatically the dissolved oxygen content in boiler feed water; also a centrifugal type flowmeter which integrates directly. Several other new instruments also were shown.

Outstanding in the exhibit of the Philadelphia Gear Works, Philadelphia, were a worm gear speed reducer, a horizontal type of motor reducer and a vertical type, for the remote control and operation of valves. The Johns-Manville Corp., New York, displayed types of industrial roofing, industrial brake lining and molded asbestos insulators, among other composition products.

Notes on Problem of Stress Relieving Welded Parts

(*Concluded from Page* 36)

may continue for several months. Elimination of trouble from this source is ample justification for stress relieving a welded steel machinery part.

Such a part which does not require subsequent machining sometimes may be mechanically stress relieved to a sufficient degree for safe use. However, an element of doubt is always present whether mechanical stress relieving is complete enough to permit machining operations without "squirming." There are strains in the elastic range in both the weld metal and in the adjacent parent metal. To remove completely such strains in both parent metal and weld metal involves costs which may exceed by a wide margin the cost of stress relieving in a furnace.

Welding of Structural Steel Reviewed in French Book

Arc welding of structural steel and notes on gas cutting of steel are subjects covered in a volume recently issued by the French Institute of Steel Construction (OTUA). This is the second volume on welding issued by the organization, the first, dealing with general characteristics of the arc welding process, having appeared in August, 1933.

Subject matter of the second volume is divided into three parts: General principles of welding, including equipment, procedure control and design rules; examples of welded joints, including girder and column sections, connections, bracing, etc.; and notes on gas cutting, including outline of process, equipment, characteristic results, and hand and machine cutting.

Copies of the book may be obtained by addressing L'Office Technique pour l'Utilization de l' Acier, 25 Rue du General Foy, Paris.

New Trade Publications

FORGING—Kropp Forge Co., 5301 West Roosevelt road, Chicago, has issued a leaflet on its forgings, illustrating a number of unusual forms produced in its shops. It is well illustrated.

AIR FILTER—C. O. Bartlett & Snow Co., 6200 Harvard avenue, Cleveland, has published a bulletin on its new flotation type air filter which employs water and a frothing filter carpet. Features claimed for the equipment are discussed.

WELDING—Lincoln Electric Co., Cleveland, is distributing a leaflet on arc-welded tier buildings, showing method of welding fixed end connections, beams to columns, with illustrations of tests to destruction of beams so welded.

TUBING WEIGHTS—Timken Steel & Tube Co., Canton, O., has issued a master weight table of round steel tubing, giving weights in lineal feet for all sizes of hot-finished and cold-drawn tubing from 1/16 to 10¾ inches and wall thickness from 36 B.W.G. to 1⅝ inches.

MICROSCOPES—Bausch & Lomb Optical Co., Rochester, N. Y., manufacturer of optical instruments, has issued a bulletin on polarizing microscopes, describing their use and advantages to be attained from their use. Various types are described in detail and their application listed.

ROCK MACHINERY—Its fourth bulletin on progress of work on Boulder dam on the Colorado river has been issued by Ingersoll-Rand Co., Phillipsburg, N. J., which is supplying the air compressing and rock drilling equipment. The bulletin contains descriptions of the cofferdams, aerial cableways, tunnels for the penstock headers, penstocks and canyon wall outlets. It is illustrated by halftones and diagrams.

BOILER PLATE—A pamphlet has been issued by the Lukens Steel Co., Coatesville, Pa., presenting specifications for chrome-manganese-silicon alloy steel boiler plate, as set forth by the American Society of Mechanical Engineers. These specifications cover this company's Cromansil steel plates.

TEMPERATURE LIMIT — Application bulletin No. 53-116 by the Leeds & Northrup Co., 4901 Stenton avenue, Philadelphia, is devoted to protection against costly overheating of furnace roofs by use of its automatic fuel cut-off. It is illustrated, its operation is described and a table of specifications is included.

TURRET LATHES—Jones & Lamson Machine Co., Springfield, Vt., in its catalog No. 34-107 describes its line of ram-type turret lathes, describing and illustrating the lathes and their details. A table of specifications is included. Equipment and accessories are also illustrated. Several pages are devoted to dimension data.

ALLOY CASTINGS—Michiana Products Corp., Michigan City, Ind., has published an illustrated booklet on its line of heat and corrosion resistant alloy castings. The text includes a general classification of materials produced. Photographs show castings for food machinery and corrosion resistant parts, canning machinery parts, trays, furniture, annealing boxes and retorts for metallurgical and chemical operations.

Scrap in Record Rise; Steel Rate Up to 30

Steelworks Grades Advance $1.50, with Shortage at Pittsburgh—Automotive Consumption Increases—November Ingots Up 12.9 Per Cent

ONE of the sharpest rises in steelworks scrap prices since the World war, and certainly the most pronounced since 1929, was accompanied last week by a 2-point advance to 30 per cent in steelworks operation.

This evidence of present market conditions, and promising portent for the near future, adds to the feeling of confidence spreading throughout the industry.

A scrap shortage has developed in the Pittsburgh district, consumers bidding up steelworks scrap $1.50 a ton. At Cleveland and Youngstown some grades also have advanced $1.50, while in other centers the market is up 25 to 75 cents. STEEL's scrap composite registers a gain of 62 cents, highest since May. At the same time pig iron buying has expanded, a lake producer booking 9000 tons.

Despite this encouraging trend, steel demand does not yet appear to be moving forward proportionately on all fronts. There is fairly brisk buying of the lighter products for automobile and agricultural consumption; structural work is in reverse, and railroads are marking time.

Government Projects To Aid Heavy Steel Products; Automobile Production Advances

This situation may be corrected shortly by what is transpiring at Washington. Evidence is accumulating that the President is to lean very heavily on spending, and that large public works projects which should mean substantial buying of material and equipment are probable.

Though steelmakers will not benefit from the tonnage before spring, this new program will entail heavy orders for structural and reinforcing steel for grade crossing separations, the most generous appropriations for naval construction since the war, and any sums the railroads may want to borrow to purchase track material and rolling stock.

In the automobile industry, Ford is back in production, turning out 2000 new models last week, and output for the industry was about 19,000 units, up from 11,000 in the preceding week. Only a normal number of unsold cars remain in dealers' hands. December last year brought an upturn to 84,376 cars; this month output is expected to exceed 100,000 compared with 65,000 in November.

Few railroads except the Van Sweringen and Santa Fe lines have disclosed 1935 buying programs. Equipment is receiving most attention at present. November freight car awards—254—were the largest for any month since June, and brought the total for 11 months to 23,719, or 9202 more than in the same period in the three preceding years combined. Structural awards dropped to 5551 tons. The navy awarded 6000 tons of plates and shapes. A 10 per cent advance in nuts and bolts restores the amount of a reduction in October.

November Ingot Output Up 8.7 Per Cent; Japan, Russia Inquiring for Rolling Mills

November's steel ingot output, 1,589,049 gross tons, was an increase of 8.7 per cent over October, while daily average output at 61,117 tons, was 12.9 per cent higher than in October. In 11 months this year, 23,319,443 tons show a gain of 12 per cent over the first 11 last year.

Daily average pig iron production in November increased 4 per cent to 31,930 gross tons, largest since August. Total output, 957,906 tons was 0.58 per cent over October. Production for 11 months, 14,949,673 tons, is 24 per cent higher than in the same period last year. Active stacks dropped from 65 on Oct. 31 to 60 on Nov. 30.

A Japanese steelworks has ordered a 68-inch, three-high rolling mill at Pittsburgh. Other Japanese producers are inquiring for plate and strip mills, and Russian inquiries are more promising. The army ordnance department, Washington, has purchased $479,000 worth of machine tools.

Pittsburgh district steelworks operations last week increased 3 points to 23 per cent; Wheeling 16 to 70; Cleveland 2 to 48; eastern Pennsylvania 2 to 20½; Chicago ½-point to 34. Other districts were unchanged, Youngstown 35; Detroit 48; New England 47; Buffalo 24; Birmingham 27½.

STEEL's iron and steel composite is up 13 cents cents to $32.35, due to scrap; the finished steel index remains $54.

COMPOSITE MARKET AVERAGES

	Dec. 8	Dec. 1	One Month Ago Nov., 1934	Three Months Ago Sept., 1934	One Year Ago Dec., 1933	Five Years Ago Dec., 1929
Iron and Steel Composite	$32.35	$32.22	$32.15	$32.15	$31.01	$35.43
Finished Steel Composite	54.00	54.00	54.00	54.00	51.10	56.33
Steelworks Scrap Composite	10.91	10.29	9.82	9.45	10.12	13.73

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip and cast iron pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	Dec. 8, 1934	Nov. 1934	Sept. 1934	Dec. 1933
Finished Material				
Steel bars, Pittsburgh	1.80	1.80	1.80	1.75
Steel bars, Chicago	1.85	1.85	1.85	1.80
Steel bars, Philadelphia	2.09	2.09	2.09	2.04
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.60
Shapes, Pitsburgh	1.80	1.80	1.80	1.70
Shapes, Philadelphia	2.00½	2.00½	2.00½	1.90½
Shapes, Chicago	1.85	1.85	1.85	1.75
Tank plates, Pittsburgh	1.80	1.80	1.80	1.70
Tank plates, Philadelphia	1.98½	1.98½	1.98½	1.88½
Tank plates, Chicago	1.85	1.85	1.85	1.75
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.75
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.25
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	2.85
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.85
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.35
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	2.95
Plain wire, Pittsburgh	2.30	2.30	2.30	2.20
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.60	2.60	2.60	2.35
Semifinished Material				
Sheet bars, open-hearth, Youngs.	$28.00	28.00	28.00	26.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	26.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	26.00
Wire rods, Pittsburgh	38.00	38.00	38.00	36.00

	Dec. 8, 1934	Nov. 1934	Sept. 1934	Dec. 1933
Pig Iron				
Bessemer, del. Pittsburgh	19.76	19.76	19.76	19.26
Basic, Valley	18.00	18.00	18.00	17.00
Basic, eastern, del. eastern Pa.	19.76	19.76	19.76	18.76
No. 2 foundry, del. Pittsburgh	19.26	19.26	19.26	18.76
No. 2 foundry, Chicago	18.50	18.50	18.50	17.50
Southern No. 2, Birmingham	14.50	14.50	14.50	13.50
No. 2X eastern, del. Philadelphia	20.63	20.63	20.63	19.63
Malleable, Valley	18.50	18.50	18.50	17.50
Malleable, Chicago	18.50	18.50	18.50	17.50
Lake Superior charcoal, del. Chi.	24.04	24.04	24.04	23.54
Gray forge, del. Pittsburgh	18.63	18.63	18.88	18.38
Ferromanganese, del. Pittsburgh	89.79	89.79	89.79	87.24
Scrap				
Heavy melting steel, Pittsburgh	$13.25	11.15	10.75	12.20
Heavy melt. steel, No. 2, east. Pa.	9.25	8.35	8.00	8.25
Heavy melting steel, Chicago	9.75	9.10	8.65	9.00
Rails for rolling, Chicago	11.25	10.35	10.05	10.35
Railroad steel specialties, Chicago	11.25	10.05	9.80	10.50
Coke				
Connellsville, furnace, ovens	3.60	3.60	3.60	3.75
Connellsville foundry, ovens	4.60	4.60	4.60	4.25
Chicago, by-product foundry, del.	9.25	9.25	9.25	9.25

Steel, Iron, Raw Material and Metals Prices

Prices conform to American Iron and Steel institute schedules. Asterisk denotes price change this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.85c
Gary, base	1.95c
Chicago, del.	1.98c
New York, del.	2.18c
Philadelphia, del.	2.14c
Birmingham, base	2.00c
St. Louis, del.	2.17c
F.o.b. cars, dock, Pacific ports	2.40c

HOT ROLLED ANN. No. 24

Pittsburgh, base	2.40c
Gary, base	2.50c
Chicago, del.	2.53c
Detroit, del.	2.60c
New York, del.	2.73c
Philadelphia, del.	2.69c
Birmingham, base	2.55c
St. Louis, del.	2.72c
F.o.b. cars, dock, Pacific ports	3.05c

GALVANIZED No. 24

Pittsburgh, base	3.10c
Gary, base	3.20c
Chicago, del.	3.23c
Philadelphia, del.	3.39c
New York, del.	3.43c
Birmingham, base	3.25c
St. Louis, del.	3.42c
San Francisco, f.o.b. cars, dock	3.70c

TIN MILL BLACK No. 28

Pittsburgh, base	2.75c
Gary, base	2.85c
St. Louis, del.	3.07c

COLD ROLLED No. 10

Pittsburgh, base	2.50c
Gary, base	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.79c
New York, del.	2.83c
F.o.b. cars, dock, Pacific ports	3.10c

COLD ROLLED No. 20

Pittsburgh, base	2.95c
Gary, base	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.24c
New York, del.	3.28c

ENAMELING SHEETS

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh. Gary base, 10 cents higher.

Tin plate, coke base contract	$5.25
Do., stock	$4.90
Long ternes, No. 24 unassorted	3.40c

Corrosion and Heat Resistant Alloys

Pittsburgh, base, cents per lb.

	Chrome-Nickel No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

	Straight Chromes No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold strip	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh, base	1.80c
New York, del.	2.08c
Philadelphia, del.	1.98½c
Boston, del.	2.20c
Buffalo, del.	2.03½c
Chicago or Gary base	1.85c
Cleveland, del.	1.98½c
Birmingham, base	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific Coast, f.o.b. cars, dock	2.25c
St. Louis, del.	2.07c

Structural Shapes

Pittsburgh, base	1.80c
Philadelphia, del.	2.00½c
New York, del	2.05¼c
Boston, del.	2.18½c
Bethlehem, base	1.90c
Chicago, base	1.85c
Cleveland, del.	1.98½c
Buffalo, base	1.90c
Gulf ports	2.20c
Birmingham, base	1.95c
Pacific Coast, f.o.b. cars, dock	2.35c

Bars

SOFT STEEL

Pittsburgh, base	1.80c
Chicago or Gary	1.85c
Duluth, base	1.95c
Birmingham, base	1.95c
Cleveland, base	1.85c
Buffalo	1.90c
Detroit, del.	1.95c
Pacific Coast ports cars, dock, c.i.f.	2.35c
Philadelphia, del.	2.09c
Boston, del.	2.20c
New York, del.	2.13c
Pitts., forg. qual.	1.95c-2.05c

RAIL STEEL
To Manufacturing Trade

Pittsburgh, base	1.70c
Chicago or Gary, base	1.75c
Moline, Ill., base	1.75c
Cleveland, base	1.75c
Buffalo, base	1.80c

IRON

Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia, base	1.89c
Pittsburgh, refined	2.75c-7.50c

REINFORCING

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo Cleve., Birm., Young	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.34c

Rail Steel

Straight lengths quoted by distributors

Pittsburgh, base	1.90c
Chicago, Buffalo, Cleveland, Birm., Young	1.95c
Gulf ports	2.30c

Wire Products □ □

(Prices apply to straight or mixed carloads; pool cars, or less, 10c up. 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base, Pitts.-Cleve. 100 lb. keg

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
Do., 16 gage and finer	5.10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting □ □

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs. and over	1.97½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot) □

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.50
4600 0.20 to 0.30 Mo. 125-1.75 Ni. 1.05
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring base
6100 Lars 1.20
6100 spring 0.70
Cr., Ni., Van. 1.50
Carbon Van. 0.95
9250 Carbon base plus extras

Piling □ □

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops □

Hot strip to 23⅛-in.

Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Phila., delivered	2.14c
New York, del.	2.18c

Cooperage hoop,

Pittsburgh	1.95c
Chicago	2.05c

Cold-rolled strip,

Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material □

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts.	
24-45 lbs.	$27.00
50-60 lbs.	$24.00
70-75 lbs.	$18.00
80-85 lbs.	$25.00
100 lbs.	$26.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll. qual.	$34.00
Angle bars, mills	2.55c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs. up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts □ □

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots. Dec. 1, 1932, lists.

CARRIAGE BOLTS

*All sizes, cut thread	70-10-10 off
*Rolled thread, ½ x 6 and smaller	70-10-10 off

MACHINE BOLTS

*All sizes, cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts,	70-10-10 off
*Tire bolts	60-10 off
*Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch	
*Rolled thread machine bolts, ½ x 6 and smaller	70-10-10 off
*Step bolts	70-10 off
*Elevator bolts	70-10 off

NUTS

*S.A.E. semifinished hex.; ½ to ⅞-inch	70-10-10 off
Do., ½ to 1-inch	70-10-10 off
Do., over 1-inch	70-10 off

HEXAGON CAP SCREWS

Milled	85 off
*Upset, 1-in., smaller	85 off

SQUARE HEAD SET SCREWS

Upset, 1-in., small	80 off
Headless set screws	75-10 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila.	6.00 off

Cut Nails □ □

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

Steel

In.	Blk.	Gal.
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

LAP WELD

Steel

2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

LINE PIPE

Steel

½, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63

Iron

⅛—1½-inch, black and galv. take 4 pts. over; 2½—6-inch 2 pts. over discounts for same sizes, standard pipe lists. 8—12-inch, no extra.

BOILER TUBES

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 2000 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 pounds, two points under base only.

SEAMLESS BOILER TUBES

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe □

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$38.00-39.00
4-in., Birmingham	41.00-42.00
4-in., Chicago	49.00-50.00
6 to 24-in., Chicago	46.00-47.00
6-in. & over, east fdy.	42.00
Do., 4-in.	45.00

Class A pipe $2 over Class B.

Stnd. fitgs., Birm. base	$100.00

Semifinished Steel □

BILLETS AND BLOOMS

4 x4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.30
Duluth	31.00
Forging, Pitts., Chi. and Buffalo	32.00
Forging, Duluth	36.00

SHEET BARS

Pitts., Cleve., Young., Chi., Buff., Canton, O., and Sparrows Point, Md.	28.00

SLABS

Pitts., Cleve., Young.	27.00

WIRE RODS

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

SKELP

Pitts., Chicago	1.70c

Coke □ □ □

Price Per Net Ton

BEEHIVE OVENS

Connellsville, fur.	$3.60- 3.85
Connellsville, fdry.	4.60
Connell. prem. fdry.	5.10
New River fdry.	6.00
Wise county fdry.	4.45- 5.25
Wise county fur.	4.00- 4.50

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.71- 9.31
Chi., ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	11.00
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.50
Philadelphia, del.	9.00

Coke By-Products □

Per gallon, producers' plants.

Tank lots

	Spot
Pure benzol	19.00c
90 per cent benzol	19.00c
Toluol	30.00c
Solvent naphtha	26.00c
Commercial xylol	26.00c

Per lb. f.o.b. New York

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

†Naphthalene flakes and balls, in bbl.	5.50c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices do not include switching charges except as noted. No. 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25; 50-cent differentials apply to any grade below 1.75. Gross tons.

BASING POINTS:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	.....	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Granite City, Ill.	18.50	18.50	18.00	.....
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
DELIVERED FROM BASING POINTS:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.02	.....	19.90	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.77	22.27	.....	.....
Brooklyn, N. Y., from Bmghm.	21.39	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.13	.....	19.01	.....
Cleveland from Birmingham	18.62	.....	18.50	.....
Indianapolis from Hamilton, O.	20.77	20.77	20.27	21.27
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.50	19.50	19.00	20.00
Muskegon, Mich., from Chicago, Toledo or Detroit	21.40	21.40	20.90	21.90
Newark, N. J., from Birmingham	20.51	.....	.....	.....
Newark, N. J., from Bethlehem.	20.89	21.39	.....	.....
Philadelphia from Birmingham.	19.88	.....	19.76	.....
Philadelphia from Swedeland, Pa.	20.26	20.76	19.76	.....
Pittsburgh district from Neville Island	(Neville Island base, plus 63c, 76c and $1.13 switching chgs.)			
Saginaw, Mich., from Detroit	20.60	20.60	20.10	21.10
St. Louis from Granite City, Ill.	19.00	19.00	18.50	.....
St. Louis from Birmingham	18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

LOW PHOS.

Basing Points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.—$23.50. Basing Point: †Johnson City, Tenn.—$23.50 †Off grade material is $19.50

Philadelphia, standard and copper bearing 24.63

GRAY FORGE		CHARCOAL	
Valley furnace	18.00	Lake Superior fur.	21.00
Pitts. dist. fur.	18.00	Do., del. Chicago	24.04

SILVERY†

Jackson County, O., base; 6%—$22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices $1.25 higher.

BESSEMER FERROSILICON†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½% Lower Lake Ports

Old range besemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

EASTERN LOCAL ORES

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

FOREIGN ORE

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. & low phos.	9.50
Swedish basic, 65%	9.00
Swedish low phos...	9.50
Spanish No. Africa basic, 50 to 60%....	9.00
Tungsten, spot, sh. ton unit, duty pd.	$17.75-18.25
N. F. fdy., 55%.....	7.00
Chrome ore, 48% gross ton, c.i.f.....	$18.00

Manganese Ore

(Nominal)

Prices, not including duty, cents per unit cargo lots.

Caucasian, 52-55%..	26.00
So. African, 52%.....	26.00
So. Afr., 49-51%.....	24.00
Indian, 58-50%	nominal
Indian, 48-50%	nominal

Refractories

Per 1000 f.o.b. Works

FIRE CLAY BRICK

First Quality

Pa., Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	45.00

Second Quality

Pa., Ill., Ky., Md., Mo., Ga., Ala.	40.00

Ohio

First quality	$40.00
Intermediary	36.00
Second quality	25.00

MALLEABLE BUNG BRICK

All bases	50.00

SILICA BRICK

Pennsylvania	$45.00
Joliet, E. Chicago....	54.00
Birmingham, Ala.....	52.00

MAGNESITE

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases	40.00
Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash.	22.00

BASIC BRICK

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Magnesite brick	$65.00
Chrome brick	45.00
Chemically bonded magnesite	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$19.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$15.50-16.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base...	85.00
Do., del. Pittsburgh	89.79
Spiegeleisen, 19-20% dom. fur. spot†	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload..	85.00
Do., 75 per cent....	126-130.00

Spot, $5 a ton higher.

Silicomang., 2½ carb.	90.00
2% carbon, 95.00; 1%,	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Ferrotungsten, stand., lb. cont. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton..	7.50
Ferrophosphorus, per ton, c. l., 17.-19% Rockdale, Tenn., basis, 18%, $2 unitage	42.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	55.00
Ferromolybdenum, stand. 50-60%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous Mill Products

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 9.00c Conn. copper

Sheets

Yellow brass (high)	14.50
Copper, hot rolled...	16.00
Lead, cut, to jobbers	7.50
Zinc, 100-lb. base....	9.50

Tubes and Pipes

High yellow brass..	17.00
Seamless copper.....	17.25

Rods

High yellow brass..	13.00
Copper, hot rolled...	13.25

Anodes

Copper, untrimmed	13.75

Wire

Yellow brass (high)	15.00

Old Metals

Deal, buying prices, cents lb.

No. 1 Composition Red Brass

New York	4.12½-4.37½
Chicago	4.25- 4.50
Cleveland	4.75- 5.00
St. Louis	4.25- 4.50

Heavy Copper and Wire

New York	5.50- 5.75
Chicago, No. 1	5.50- 5.75
*Cleveland	5.00- 5.50
St. Louis	5.00- 5.25

Composition Brass Borings

New York	3.75- 4.00

Light Copper

New York	4.37½-4.62½
Chicago	4.12½-4.37½
*Cleveland	4.25- 4.75
St. Louis	4.25- 4.50

Light Brass

Chicago	2.12½-2.37½
Cleveland	2.25- 2.50

Lead

New York	2.65- 2.75
Cleveland	2.50- 2.75
Chicago	2.50- 2.62½
*St. Louis	2.65- 2.75

Zinc

New York	1.75- 2.00
*Cleveland	1.75- 2.00
*St. Louis	2.40- 2.50

Aluminum

*Borings, Cleveland	6.50- 7.00
*Mixed, cast, Cleve.	11.25-11.75
*Mixed, cast, St. L.	11.50-12.00
*Clips, soft, Cleve....	12.75-13.25

Secondary Metals

Brass ingot, 85-5-5-5	8.25
Stand, No. 12 Alum.	15.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL	
Birmingham	8.00- 8.50
Boston, dock, expt.	8.00- 8.25
Buffalo, No. 1	9.75-10.25
Buffalo, No. 2	8.75- 9.25
Chicago, No. 1	9.50-10.00
Cleveland, No. 1	10.00-10.50
Cleveland, No. 2	9.50-10.00
Detroit, No. 1	8.00- 8.50
Detroit, No. 2	7.00- 7.50
Eastern Pa.	10.50-11.00
Eastern Pa., No. 2	9.00- 9.50
Federal, Ill.	7.00- 7.50
Granite City, R. R.	8.00- 8.50
Granite City, No. 2	6.50- 7.00
N. Y., deal. No. 2	7.00
N. Y., deal. R. R.	8.50
Pittsburgh, No. 1	13.00-13.50
St. Louis	7.00- 7.50
Valleys, No. 1	12.50-13.00

COMPRESSED SHEETS	
Buffalo, dealers	8.75- 9.25
Chicago, factory	8.50- 9.00
Cleveland	10.00-10.50
Detroit	8.25- 8.75
E. Pa., new mat.	9.50-10.00
Pittsburgh	13.00-13.50
St. Louis	5.50- 6.00
Valleys	12.00-12.50

BUNDLED SHEETS	
Buffalo	6.50- 7.00
Cincinnati, del.	6.50- 7.00
Cleveland	7.50- 8.00
Pittsburgh	11.00-11.50
St. Louis	4.50- 5.00

SHEET CLIPPINGS, LOOSE	
Chicago	5.00- 5.50
Cincinnati	5.50- 6.00
Detroit	5.00- 5.50
St. Louis	4.00- 4.50

STEEL RAILS, SHORT	
Birmingham	10.50-11.50
Buffalo	11.75-12.25
Chicago (3 ft.)	11.00-11.50
Chicago (2 ft.)	12.50-13.00
Cincinnati, del.	11.00-11.50
Detroit	11.00-11.50
Pitts., open-hearth, 3 ft. and less	15.00-15.50
St. Louis, 2 ft. & less	10.50-11.00

STEEL RAILS, SCRAP	
Boston	5.25- 5.50
Chicago	9.50-10.00
Pittsburgh	13.25-13.75

STOVE PLATE	
Birmingham	5.50- 6.00
Boston, dealers	3.25- 3.75
Buffalo	8.75- 9.00
Chicago, net	5.75- 6.25
Cincinnati, dealers	5.50- 6.00
Detroit, net	6.00- 6.50
Eastern Pa.	8.50- 9.00
N. Y., deal. fdry.	6.00
St. Louis	5.50- 6.00

COUPLERS, SPRINGS	
Buffalo	12.00-12.50
Chicago, springs	11.00-11.50
Eastern Pa.	13.50-14.50
Pittsburgh	15.50-16.00
St. Louis	8.50- 9.00

ANGLE BARS—STEEL	
Chicago	10.25-10.75
St. Louis	8.00- 8.50

RAILROAD SPECIALTIES	
Chicago	11.00-11.50

LOW PHOSPHORUS	
Buffalo, billets and bloom crops	11.50-12.00
Cleveland, billet, bloom crops	14.00-14.50
Eastern Pa., crops	13.50-14.00
Pittsburgh, billet, bloom crops	15.50-16.00
Pittsburgh, sheet bar crops	15.00-15.50

FROGS, SWITCHES	
Chicago	9.50-10.00
St. Louis, cut	8.50- 9.00

SHOVELING STEEL	
Chicago	9.50-10.00
Federal, Ill.	6.75- 7.00
Granite City, Ill.	6.00- 6.50

RAILROAD WROUGHT	
Birmingham	7.00- 7.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	7.50- 8.00
Buffalo, No. 2	9.75-10.25
Chicago, No. 1, net	9.00- 9.50
Chicago, No. 2	9.50-10.00
Cincinnati, No. 2	8.00- 8.50
Eastern Pa.	11.50-12.00
N. Y., No. 1, deal.	7.00- 7.50
St. Louis, No. 1	5.75- 6.25
St. Louis, No. 2	7.00- 7.50

SPECIFICATION PIPE	
Boston	3.00- 3.25
Eastern Pa.	8.50
New York, dealers	3.50- 4.00

BUSHELING	
Buffalo, No. 1	8.75- 9.25
Chicago, No. 1	8.50- 9.00
Cinci., No. 1, deal.	6.00- 6.50
Cincinnati No. 2	3.50 -4.00
Cleveland, No. 2	7.00- 7.50
Detroit, No. 1, new	7.00- 7.50
Valleys, new, No. 1	12.00-12.50

MACHINE TURNINGS	
Birmingham	4.50- 5.00
Boston, dealers	1.75- 2.00
Buffalo	4.75- 5.25
Chicago	4.50- 5.00
Cincinnati, dealers	4.00- 4.50
Cleveland	6.50- 7.00
Detroit	5.00- 5.50
Eastern Pa.	5.50- 6.00
New York, dealers	2.00- 2.25
Pittsburgh	8.50- 9.00
St. Louis	3.00- 3.50
Valleys	9.25- 9.75

BORINGS AND TURNINGS	
For Blast Furnace Use	
Boston, dealers	3.25- 3.50
Buffalo	5.50- 6.00
Cincinnati, dealers	4.00- 4.50
Cleveland	7.00- 7.50
Detroit	5.50- 6.00
Eastern Pa.	5.00
New York, dealers	1.50- 1.75
Pittsburgh	5.75- 6.25

CAST IRON BORINGS	
Birmingham, plain	4.50- 5.00
Boston, chemical	8.50- 9.00
Boston, dealers	3.25- 3.50
Buffalo	5.50- 6.00
Chicago	5.50- 6.00
Cincinnati, dealers	4.00- 4.50
Cleveland	7.00- 7.50
Detroit	5.50- 6.00
E. Pa., chemical	12.00-13.00
New York, dealers	1.50- 1.75
Pittsburgh	5.75- 6.25
St. Louis	3.00- 3.50

PIPE AND FLUES	
Cincinnati, dealers	4.50- 5.00

RAILROAD GRATE BARS	
Buffalo	6.50- 7.00
Chicago, net	5.00- 5.50
Cincinnati	4.50- 5.00
Eastern Pa.	8.50- 9.00
New York, dealers	4.00- 4.50
St. Louis	4.50- 5.00

FORGE FLASHINGS	
Boston, dealers	4.50- 4.75
Buffalo	8.50- 9.00
Cleveland	8.50- 9.00
Detroit	7.00- 7.50

FORGE SCRAP	
Boston, dealers	3.75- 4.00
Chicago, heavy	11.00-11.50
Eastern Pa.	9.00- 9.50

ARCH BARS, TRANSOMS	
St. Louis	10.50-11.00

AXLE TURNINGS	
Boston, dealers	3.00- 3.50
Buffalo	7.00- 7.50
Chicago, elec. fur.	9.00- 9.50
Cleveland	7.00- 7.50
Eastern Pa.	9.00- 9.50
St. Louis	6.50- 7.00

STEEL CAR AXLES	
Birmingham	10.00-10.50
Boston, ship. point.	10.00-10.50
Buffalo	12.00-12.50
Chicago, net	14.00-14.50
Eastern Pa.	16.50-17.00
St. Louis	11.25-11.75

SHAFTING	
Boston, ship. point.	11.25-11.75
Eastern Pa.	16.50-17.00
New York, dealers	10.75-11.25
St. Louis	11.50-12.00

CAR WHEELS	
Birmingham, iron	9.00- 9.50
Boston, iron deal.	5.00- 5.50
Buffalo, iron	11.00-11.50
Buffalo, steel	12.00-12.50
Chicago, iron	10.25-10.75
Chicago, rolled steel	11.00-11.50
Cincinnati, iron	8.50- 9.00
Eastern Pa., iron	10.50-11.00
Eastern Pa., steel	13.50-14.50
Pittsburgh, iron	12.00-12.50
Pittsburgh, steel	15.50-16.00
St. Louis, iron	7.25- 7.75
St. Louis, steel	8.75- 9.25

NO. 1 CAST SCRAP	
Birmingham	8.50- 9.00
Boston, No. 2	6.00
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	9.50-10.00
Buffalo, mach.	10.75-11.25
Chicago, agri. net	8.00- 8.50
Chicago, mach. net	9.00- 9.50
Chicago, railroad net	8.50- 9.00
Cinci., mach. cup	9.00- 9.50
Cleveland, cupola	11.50-12.00
Detroit, net	8.50- 9.00
Eastern Pa., cupola	11.00-11.50
Pittsburgh, cupola	13.50-14.00
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	7.50- 8.00
St. L., No. 1 mach.	9.00- 9.50

HEAVY CAST	
Boston, del.	5.00- 5.25
Buffalo, break.	8.00- 8.50
Cleveland, break.	8.50- 9.00
Detroit, break.	6.50- 7.00
Detroit, auto net	9.00- 9.50
Eastern Pa.	10.00
N. Y., break. deal.	6.00- 6.25
Pittsburgh	12.00-12.50

MALLEABLE	
Boston, consum.	10.00-10.50
Buffalo	10.50-11.00
Chicago, R. R.	11.00-11.50
Cincinnati, agri. del.	8.00- 8.50
Cleveland, rail	11.50-12.00
Detroit, auto	9.00- 9.50
St. Louis, R. R.	8.00- 8.50
Eastern Pa., R. R.	10.50-11.00

RAILS FOR ROLLING	
5 feet and over	
Birmingham	9.50-10.50
Boston, dealers	8.00- 8.50
Buffalo	10.25-10.75
Chicago	11.00-11.50
Eastern Pa.	12.50-13.00
New York, dealer	7.50- 8.00
St. Louis	9.50-10.00

LOCOMOTIVE TIRES	
Chicago (cut)	10.00-10.50
St. Louis, No. 1	10.00-10.50

LOW PHOS. PUNCHINGS	
Buffalo	12.00-12.50
Chicago	11.50-12.00
Eastern Pa.	14.50-15.00
Pittsburgh	14.50-15.00

Nonferrous Metal Prices of the Week

Spot unless otherwise specified. Cents per pound

	Copper: Electro., del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead: New York N. Y.	Lead: East St. L.	Zinc: St. L.	Aluminum 99%	Antimony: Spot, N. Y.	Nickel Cathodes
Dec. 1	9.00	9.12½	7.37½	51.15	51.22½	3.50	3.35	3.70	*19.00	13.50	35.00
Dec. 3	9.00	9.12½	7.37½	51.00	51.07½	3.50	3.35	3.70	*19.00	13.75	35.00
Dec. 4	9.00	9.12½	7.37½	50.85	50.90	3.50	3.35	3.70	*19.00	13.75	35.00
Dec. 5	9.00	9.12½	7.37½	50.90	50.95	3.50	3.35	3.70	*19.00	13.75	35.00
Dec. 6	9.00	9.12½	7.37½	51.05	51.10	3.50	3.35	3.70	*19.00	13.75	35.00
Dec. 7	9.00	9.12½	7.37½	50.90	50.95	3.50	3.35	3.70	*19.00	13.75	35.00

*Nominal range 19.00c to 21.00c.

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*	2.90c
Boston††	2.95c
Buffalo	3.00c
Chattanooga	3.31c
Chicago	2.95c
Cincinnati	3.15c
Cleveland	2.95c
Detroit	3.03½c
Houston	3.00c
Los Angeles	3.70c
New Orleans	3.30c
New York‡(d)	3.22c
Pittsburgh(h)	2.90c
Philadelphia*	2.90c
San Francisco	3.60c
Seattle	3.60c
St. Louis	3.19c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS	
Portland	3.40c
Chattanooga	3.31c
Baltimore*	3.00c
Chicago	2.75c
Cincinnati	3.15c
New York‡(d)	3.32c
Philadelphia*	2.90c
St. Louis	3.19c
Tulsa	3.25c

REINFORC. BARS	
Buffalo	2.60c
Chattanooga	3.31c
Chicago	2.10c-2.60c
Cleveland(c)	1.97½c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.15c
New Orleans	3.50c
Pitts., plain(h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	3.50c
St. Louis	3.24c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES	
Baltimore*	3.90c
Boston††	3.17c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland	3.31c
Detroit	3.40c
Houston	3.00c
Los Angeles	3.70c
New Orleans	3.55c
New York(d)	3.37c
Philadelphia*	2.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c

PLATES	
Baltimore*	2.90c
Boston††	3.18c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland, ¼-in. and over	3.31c
Detroit	3.40c
Detroit, ⅜-in.	3.65c
Houston	3.00c
Los Angeles	3.70c
New Orleans	3.55c
New York(d)	3.40c
Philadelphia*	2.95c
Phila. floor	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE	
Baltimore*	3.05c
Boston††	3.25c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.00c
Cincinnati	3.20c
Cleveland	3.11c
Det., 8-10 ga.	3.13½c
Houston	3.35c
Los Angeles	3.80c
New Orleans	3.55c
New York	3.27c
Portland	3.75c
Philadelphia*	3.05c
Pittsburgh(h)	2.95c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.29c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK	
Baltimore*†	3.51c
Boston (g)	3.90c
Buffalo	3.25c
Chattanooga	4.21c
Chicago	3.85c
Cincinnati	4.05c
Cleveland	3.91c
Detroit	3.98½c
Los Angeles	4.45c
New York	3.85c
Philadelphia*†	3.55c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis	4.09c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS	
Baltimore*†‡	4.21c
Buffalo	4.00c
Boston (g)	4.60c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.70c
Cleveland	4.61c
Detroit	4.70c
Houston	4.40c
Los Angeles	5.05c
New Orleans	4.95c
New York	4.50c
Philadelphia*†	4.25c
Pitts.** (h)	4.15-4.45c
Portland	5.00c
San Francisco	*5.00c
Seattle	5.00c
St. Louis	4.79c
St. Paul	4.19c
Tulsa	5.10c

BANDS	
Baltimore*	3.15c
Boston††	3.25c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.45c
Cleveland	3.36c
Detroit, ⅛-in. and lighter	3.38½c
Houston	3.25c
Los Angeles	3.90c
New Orleans	3.59c
New York(d)	3.62c
Philadelphia	3.15c
Pittsburgh(h)	3.20c
Portland	3.90c
San Francisco	4.05c
Seattle	3.90c
St. Louis	3.54c
St. Paul	3.20c
Tulsa	3.45c

HOOPS	
Baltimore	2.30c
Boston	4.25c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.45c
Det., No. 14 and lighter	3.38½c
New York	3.62c
Philadelphia	3.40c
Pittsburgh(h)	3.70c
Seattle	5.60c
St. Louis	3.54c
St. Paul	3.75c

COLD FIN. STEEL	
Baltimore (c)	3.71c
Boston	4.00c-4.50c
Buffalo (h)	3.55c
Chattanooga*	4.06c
Chicago (h)	3.50c
Cincinnati	3.70c
Cleveland (h)	3.50c
Detroit	3.63½c
Los Ang.(f)(d)	4.95c
New Orleans	4.30c
New York	3.92c-4.42c
Philadelphia	3.73c
Pittsburgh(h)	3.45c
Portland (f)	4.75c
San Fran.(f)(d)	5.95c
Seattle (f) (d)	4.75c
St. Louis	3.74c
St. Paul	3.20c
Tulsa	4.65c

COLD ROLL. STRIP	
Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	3.39c
Chicago	3.27c
Cincinnati(b)	3.42c
Cleveland (b)	3.20c
Detroit	3.33c
New York	4.70c
St. Louis	3.36c

(b) Plus straightening, cutting and quantity differentials.

(c) Plus mill, size and quantity extras.

(d) Minus quant. diff.

(e) New mill classif.

(f) Rounds only.

(g) 50 bundles or over.

(h) Outside delivery, 10c less.

‡Domestic bars.

*Plus quan. extras.

**Under 25 bundles.

*†50 or more bundles.

†New extras apply.

††Base 40,000 lbs. extras on less.

Prices at Detroit, Cleveland, Chicago, Pittsburgh, Cincinnati, Chattanooga, New York, Boston, St. Louis on heavier lines are subject to new quantity differentials:

399 pounds and less, up 50 cents; 400 to 9999 pounds, base; 10,000 to 19,999 pounds, 15 cents under; 20,000 to 39,999 pounds, 25 cents under; 40,000 pounds and over, 35 cents under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Dec. 6

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons. Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$15.25 3 1 6	$13.21	1 13 0
Basic bessemer	13.64 2 15 0*	12.41	1 11 0
Hematite, Phos. .03-.05	15.50 3 2 6	.....	.....
SEMIFINISHED STEEL			
Billets	$27.28 5 10 0	$18.85	2 7 0
Wire rods, No. 5 gage	38.69 7 16 0	36.08	4 10 0
FINISHED STEEL			
Standard rails	$38.44 7 15 0	$44.10	5 10 0
Merchant bars	1.66c 7 10 0	1.15c to 1.19c	3 2 6 to 3 5 0
Structural shapes	1.63c 7 7 6	1.12c	3 1 6
Plates, †¼ in. or 5 mm.	1.77c 8 0 0	1.50c	4 2 6
Sheets, black, 24 gage or 0.5 mm.	2.04c 9 5 0	2.11c	5 16 0
Sheets, gal., 24 gage, corr.	2.49c 11 5 0	2.36c	6 10 0
Bands and strips	1.88c 8 10 0	1.45c	4 0 0
Plain wire, base	2.04c 9 5 0	1.94c	5 7 6
Galvanized wire, base	2.49c 11 5 0	2.27c to 2.32c	6 5 6 to 6 7 6
Wire nails, base	2.65c 12 0 0	2.09c	5 15 0
Tin plate, box 108 lbs.	$ 4.46 0 18 2	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$16.74	3 7 6(a)	$13.84	210	$14.51	310	$25.33	63
Basic bessemer pig iron	16.74	3 7 6(a)*	12.19	185	12.64	270	27.95	(b)69.50
Furnace coke	4.34	0 17 6	7.91	120	5.15	110	7.64	19
Billets	27.28	5 10 0	28.34	430	20.59	440	38.80	96.50
Standard rails	1.82c	8 5 0	2.08c	694	2.31c	1,100	2.40c	132
Merchant bars	1.90c	8 12 0	1.68c	560	1.16c	550	2.00c	110
Structural shapes	1.93c	8 15 0	1.65c	550	1.16c	550	1.96c	107.50
Plates, †¼-in. or 5 mm.	2.00c	9 1 3	2.10c	700	1.47c	700	2.31c	127
Sheets, black	2.32c	10 10 0§	2.55c	850‡	1.63c	775‡	2.62c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.87c	13 0 0	4.50c	1,500	3.15c	1,500	6.73c	370
Plain wire	2.04c	9 5 0	3.15c	1,050	2.31c	1,100	3.15c	173
Bands and strips	2.07c	9 7 0	1.95c	650	1.47c	700	2.31c	127

*Basic. †British ship-plates. Continental, bridge plates. 24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel a del. Middlesbrough. b hematite.

**Gold pound sterling carries a premium of 64.75 per cent over paper sterling.

Bars

Bar Prices, Page 62

Pittsburgh—As outlined on page 79, the difference between bars, and both common and combination wire rods, has been established for effect on sales for delivery on or after Jan. 1, 1935. Included in the same list of extras for the same application are certain revisions in merchant steel bars. The market base holds steady at 1.80c, Pittsburgh, for carbon bars and 2.45c, Pittsburgh, on alloy quality. Considerably more automotive and agricultural implement specifications are being placed.

Cleveland—Tonnage is improving, with most represented by specifications from automobile manufacturers and forge shops on automobile work, a fairly good demand from agricultural implement makers, and some gains in orders from machinery builders. Releases last week for some leading sellers here were the best in several months. The bill providing for a 3 per cent sales tax, including all iron and steel products, has passed the Ohio legislature and is due to become effective Jan. 1. Some details remain to be determined in committee conference before final approval. Sellers say it has not been a stimulus in recent buying.

Chicago—While a few first quarter inquiries are being received, buying principally is in small lots for immediate needs. Requirements of farm implement and automotive manufacturers are well maintained. Most consumers are expected to enter the inventory period with low stocks, a factor which will aid expansion in shipments next quarter. Prices for that period are being continued at 1.85c, base, for soft steel bars, 1.75c for rail steel and 1.80c, Chicago, for bar iron.

Boston—Commercial steel bar buying continues in small lots for broad miscellaneous requirements, most larger consumers taking only limited shipments. Stocks are generally low, and, while books are open for next quarter, the character of buying has not materially changed. Forging and alloy bar volume is not large.

New York—The bar market is stimulated by better releases from bolt and nut manufacturers, who are anticipating buying in view of a scheduled price advance Jan. 1. Better specifications are also coming from tool manufacturers, some of whom are experiencing the best business in months.

Montana Chrome Inc., Billings, Mont., expects to start shipment in February of 45-50 per cent chrome concentrates from its plant at Red Lodge, Mont. Howard E. Motts, Western Reserve building, Cleveland, is sales representative for the company.

Plates

Plate Prices, Page 62

Pittsburgh—Early closing on three additional standard 175-foot coal barges by the West Kentucky Coal Co., Paducah, Ky., is promised, requiring 157 tons of plates each. This will follow upon the same buyer's purchase of seven barges from Marietta Mfg. Co., Point Pleasant, W. Va., recently. Pittsburgh Piping & Equipment Co., Pittsburgh, is now fabricating eight sections of 20-inch suction pipe for an army dredge at New Orleans. Treadwell Construction Co., Midland, Pa., is low at $3238 on Fort Peck dam dredge suction pipes on Nov. 21 bid. Inquiries should be issued soon for as many as 40 covered-cargo type and coal barges from a transportation company in Chicago which will haul coal on contract for the Commonwealth Edison Co., Chicago. Plates are firm at 1.80c, Pittsburgh.

Cleveland—Sellers are encouraged by a slight gain in small orders for plates. Some carload purchases are noted for the larger sizes of tanks for wholesale gasoline distribution. Boiler manufacturers also have been buying a little more material. Railroads for the present are out of the market. The Cleveland plate mill was idle last week.

Chicago—Plate orders are light, with a moderate volume of business in prospect for federal dam construction. While a few small water tanks sponsored by PWA funds are being placed regularly, activity in other types of tank work is quiet. Railroads particularly are making few purchases. Plate requirements for railroad equipment building also are light, with the outlook for new business in cars and locomotives uncertain. Miscellaneous plate business shows little change and usually consists of small lots.

Boston—Plate buying continues slack except for navy yard requirements. Miscellaneous needs account for most of the volume. Few larger consumers have covered for next quarter. Plates are steady at 2.20c, Boston.

New York—Plate business is sustained at a modest rate with the Standard Oil Co. of New Jersey, New York, closing on a substantial tonnage for refinery specialties in the Argentine with American producers and also on a special pipe line. Lummus Co., 50 Church street, New York, is engineer but the material was bought direct by Standard. No interest is being taken in first quarter contracting, a condition applying to most steel lines, with sellers generally sending out contract forms on request.

Philadelphia—Plate demand is a shade better with the New York Shipbuilding Co., Camden, N. J., specifying for plates for the light cruiser PHOENIX. Baltimore & Ohio is figuring on 800 tons of plates for locomotive repairs. Shipbuilders are inquiring for 600 tons of plates, shapes and bars for a ferryboat for the Erie. Bids are in for 400 tons for tanks for du Pont interests at Edgemoor, Del. Fair specifications are being received for heavy slabs for turbine rotors. While release of specifications probably will extend over many months the navy has awarded about 4400 tons of black and galvanized plates and sheets against schedule 3400 on which bids closed Nov. 2. The tonnage was awarded by lot as indicated below.

San Francisco—Orders for plates are of miscellaneous character, with few lots of more than a carload. Bids have been opened on 192 tons for a pipe line for Los Angeles and on 162 tons for a penstock for Boulder dam, Boulder City, Nev.

Seattle — Bids were opened this week at Ontario, Oreg., by reclamation bureau officials for 4000 tons of plates and a small tonnage of shapes for the Malheur and Dead Ox siphons, Owyhee project, in Oregon and Idaho. Consolidated Steel Corp., Los Angeles, was low at $606,872, Puget Sound Machinery Depot, Seattle, second low at $637,-918. Alternate bids for concrete showed American Concrete & Steel Pipe Co. low at $684,663. Unnamed interests have been awarded 1100 tons of plates for the Puget Sound, Wash., Navy yards, and 500 tons plates and sheets for Mare Island, Calif., Isaacson Iron Works, Seattle, is fabricating about 100 tons plates for the conveyor system at Coulee dam, Washington.

Contracts Placed

4419 tons, 2287 tons galvanized, 2132 tons plain black, eight destroyers, navy yards, Boston, Norfolk, Va., Mare Island, Calif., and Puget Sound, Washington, awarded as follows: galvanized —Central Iron & Steel Co., Harrisburg, Pa., 1027; Joseph P. Cattie, Philadelphia, 782; Alan Wood Steel Co., Conshohocken, Pa., 212; Penn Galvanizing Co., Philadelphia, 545; American

Sheet & Tin Plate Co., Pittsburgh, 405. Plain black—Lukens Steel Co., Coatesville, Pa., 202; Youngstown Sheet & Tube Co., Youngstown, O., 738; Alan Wood Steel Co., 320; Carnegie Steel Co., Pittsburgh, 187. Awarded by lot.

Contracts Pending

4500 tons, plate, shapes and bars, first quarter requirements, Norfolk & Western; bids Dec. 19 to Clyde Cocke, purchasing agent, Roanoke, Va.

4000 tons, siphons for Malheur and Dead Ox projects, Oregon and Idaho; Consolidated Steel Corp., Los Angeles, low.

1255 tons, black and galvanized, bureau of supplies and accounts, navy, delivery Brooklyn, schedule 3811, postponed Dec. 4 to 11.

192 tons, 18-inch, 14-gage pipe, specification 1564, Los Angeles; bids opened.

162 tons, penstock, Boulder dam, Boulder City, Nev., specification 633-D; Hendrie & Bolthoff Mfg. & Supply Co., Denver, low.

102 tons, plates and sheets, 42 tons of latter zinc-coated, bureau of supplies and accounts, navy department, Washington, schedules 3883 and 3882, closing Dec. 18.

Sheets

Sheet Prices, Page 62

Pittsburgh — No important gains in sheet mill operations from the present 38-40 per cent average for the industry are expected through the remainder of December, but the placing of orders for shipment in January should be heavier in the coming few weeks. There appears to be no prospect of any early change in sheet prices at Pittsburgh.

Cleveland—Largest orders for sheets during the week came from partsmakers working on Plymouth's requirements, which are expanding briskly. The general market situation remains favorable, and producers believe a sustained buying movement will develop from the automobile industry shortly. Business so far has been coming in spurts. Last week the Cleveland sheets mills dropped to 25 per cent, and production in a nearby lake district also slowed up. Refrigerator manufacturers have increased schedules for new models.

Boston — Sheet buying holds to the recent rate with small orders predominating, although consumers are purchasing more frequently without building up stocks. Inquiry for alloy and stainless steel sheets for kitchen equipment is up slightly.

Chicago — Sheet demand and production continue relatively high, aided by a fair volume of automotive business. While the latter has shown steady gains over recent weeks, tonnages involved still are only moderate but are expected to be increased during the next several weeks. Farm implement manufacturers are one of the leading prospects for fairly heavy sheet consumption over coming months. Stocks of most consumers have been reduced sufficiently during the past months to assure some expansion in buying after the inventory period.

New York—Sheet shipments are showing considerable steadiness, at a lower rate than last month.

Philadelphia — Autobody specifications are increasing with further substantial tonnage likely to be closed shortly. The market otherwise is quiet, general specifications continuing at about the November rate.

Cincinnati—Sheet production during the past week was sustained close to 40 per cent. Contracting for first quarter is not general, most users buying for early needs and prompt shipment.

St. Louis—Miscellaneous demands account for the major part of sheet tonnages, now moving. Inquiries indicate more business is in prospect. Galvanized is more active in southern states.

Birmingham, Ala. — Agricultural districts are taking a little more tonnage. Hardware dealers have built up good stocks of varied classes of sheets.

Transportation

Track Material Prices, Page 63

Buying of domestic freight cars in November totaled 254, the best month in the last half, although four months in first half showed larger totals. The total for 11 months is 23,719 cars, which exceeds any full year since 1930. Export sales of cars during November were the best for some time, with 1250 standard freight cars and 200 narrow-gage cars being sold for delivery to Mexican roads. Comparisons follow:

	1934	1933	1932	1931
Jan.	152	3	159	100
Feb.	19,725	0	35	50
March	30	5	105	2,166
April	800	50	0	2,798
May	717	8	60	20
June	1,835	500	0	1,910
July	19	306	25	617
Aug.	105	202	5	1,304
Sept.	7	23	1,298	703
Oct.	75	514	0	980
Nov.	254	533	2	35
11 mo.	23,719	2,144	1,689	10,684
Dec.	.....	316	50	11
Total	.....	2,460	1,739	10,694

Passenger equipment, principally new-style trains and locomotives of streamlined design, is receiving most attention at present, including air conditioning of existing passenger equipment.

Rail buying apparently is awaiting plans for government financing. The Pennsylvania will open bids Dec. 12 under the Clayton act for miscellaneous steel requirements, not exceeding 5000 tons. Norfolk & Western has asked permission of the interstate commerce commission to build two extensions totaling about 39 miles along the Levisa river, Buchanan county, Virginia. Baltimore & Ohio has added about 600 shop workers on repairs at various centers.

Eastern roads are appraising next year's rail requirements, with one large carrier planning a heavier program than in the past two or three years. The Lehigh Valley is expected momentarily to allot the steel for repairs to 1350 box cars at its shops at Sayre, Pa. Estimates vary sharply as to the tonnage required. The work will require a year.

Buses Placed

Lovell Bus Lines, Boston, four 32-passenger city-type buses, with horizontal engines; to White Motor Co., Cleveland.

Scranton Bus Co., Scranton, Pa., two 32-passenger city-type with horizontal engine; to White Motor Co., Cleveland.

Anthony & Carmella Sorentina, Newark, N. J., one 32-passenger city type, with horizontal engine, to White Motor Co., Cleveland.

Carolina Coach Co., Charlotte, N. C., four airstreamed, 21-passenger buses, to White Motor Co., Cleveland.

Crescent Stages Inc., Birmingham, Ala., one chassis; to White Motor Co., Cleveland.

Fullington Auto Bus Co., Pittsburgh, one chassis; to White Motor Co., Cleveland.

California-Nevada Stages Inc., San Francisco, one chassis, to White Motor Co., Cleveland.

Charles W. Spencer, Baltimore, one 25-passenger pay enter bus; to White Motor Co., Cleveland.

Essex county, New Jersey, one prison van; to White Motor Co., Cleveland.

East Street Bus Lines Inc., Boston, one 21-passenger pay enter Indiana-type; to White Motor Co., Cleveland.

New Orleans Public Service Co., New Orleans, twelve 24-passenger city type Indiana buses; to White Motor Co., Cleveland.

Strip Steel

Strip Prices, Page 63

Pittsburgh—An increase of about 10 per cent in strip steel operations to 35 per cent occurred last week, the improvement being supported almost entirely by hot strip. Most strip tonnage for the automobile industry is being held up for shipment after the first of the year. Hot strip at 1.85c, Pittsburgh and cold at 2.60c,

Pittsburgh or Cleveland, are unchanged.

Cleveland—Volume of orders improved during the week, chiefly for hot strip, and from the Chrysler Automobile Co., and its partsmakers. Other automobile manufacturers also made some purchases, but few orders exceeded 100-ton lots. Automobile business generally still is in a preliminary phase, sellers appearing confident demand will increase considerably later this month.

Chicago—Improvement in strip demand is slow. While business from miscellaneous consumers is holding well, requirements of the automotive industry are expanding somewhat more slowly than had been anticipated. Most business is for prompt needs, with consumers still showing little interest in first quarter contracts. Business for that period is quoted 1.95c, Chicago, for hot strip and 2.60c, Pittsburgh-Cleveland, for cold-rolled strip.

Boston—Cold-rolled strip buyers continue to order in spot lots and it is difficult for rerollers to accumulate volume of a size, width or heat for sustained rolling schedules. Aggregate incoming business, however, is slightly heavier. Demand for stainless steel strip, which has been seasonally fair for oil burners, has declined.

New York—While generally quiet, steel strip tonnage is being sustained at the rate of the past fortnight, with steady buying for refrigerator and general manufacturing.

Philadelphia—Steel strip offers no features and prices are unchanged.

Metallurgical Coke

Coke Prices, Page 63

Spot purchases continue to make most beehive coke sales with unchanged prices at $3.85 per ton on furnace coke, $4.60 per ton on common foundry coke, Connellsville, Pa., ovens, reaffirmed by the code authority for December. Premium beehive coke is unchanged at $5.10 to $5.35. Practically no users are availing themselves of contracts and the chief prospect in the market for some time seems to be in coke for domestic heating uses.

Shipments of by-product foundry coke are well maintained at Chicago. Prices continue at $8.50, ovens, for outside delivery, and $9.25, delivered, Chicago. Cincinnati makers find shipments of by-product foundry coke moderately heavier at unchanged prices. Production at Birmingham, Ala., is steady and prices are firm.

BUNDYWELD
STEEL
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Resists Vibration
Because of its ability to withstand vibration, its great strength, and recuperative properties, Bundyweld Tubing has been proven superior for such installations as gas, oil, brake, and vacuum lines. It has the strength of steel with sufficient ductility to permit easy fabrication.
Bundyweld Steel Tubing is rolled from strip steel which has been previously copper-coated on two sides, and is then Copper-Hydrogen-Welded into a solid structure.
The reducing atmosphere of the welding process leaves the tube absolutely clean and free from scale. It may be heat-treated without injury.
Both I. D. and O. D. are held to tolerances of .003". Uniformity of wall thickness is an outstanding feature. Bundyweld tubing is furnished in base sizes of 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", and 5/8" in various wall thicknesses. It can be redrawn to any odd size required. Furnished in lengths of completely fabricated, either with or without fittings. Send blue prints or samples for quotations. Complete information upon request.
BUNDY
TUBING CO.
DETROIT

Shapes

Structural Shape Prices, Page 62

Cleveland—Construction contractors are being notified by their associations to buy material for jobs for which they have taken specific contracts before Jan. 1, when according to all indications the 3 per cent Ohio sales tax will go in effect. This is having considerable influence in their general material buying, though there are relatively few steel contracts to be awarded to fabricators. It will be a factor in causing 3000 tons of shapes to be placed this month for the Lorain road bridge over Rocky river, Cuyahoga county (Cleveland), and some minor tonnages. Though the bill provides for the consumer paying the tax, it is not yet clear who will pay on the material for state work, now comprising the bulk of structural steel requirements.

Pittsburgh—Structural inquiries have fallen to probably the lowest point of the year. Bids were taken Dec. 6 on the 2500-ton Gallipolis, O., dam, with Dravo Contracting Co., Pittsburgh, low.

Fort Pitt Bridge Works, Pittsburgh, has taken an order for a 200-ton building for the Fort Pitt Bedding Co., Pittsburgh. Plain structural material is firm at 1.80c, Pittsburgh.

Chicago—Central Engineering Co., Davenport, Iowa, is expected to receive the general contract for the Muscatine dam, taking around 5000 tons of plates, shapes and piling. Plans for the Guttenberg, Iowa, dam are looked for this week, with bids likely to be taken early in January. Other pending work includes 1500 tons for a bridge at Ottumwa, Iowa, and 1400 tons for a bridge at Gans, Okla. Awards are small individually and collectively, and include 450 tons for construction for the Ford Motor Co. at River Rouge, Mich. Production of the 21,000 tons of piling for the Grand Coulee dam is to be started by the Inland Steel Co. promptly, with delivery to be completed in March.

Philadelphia—Pennsylvania and New Jersey state bridge work is outstanding in an otherwise dull structural market. The leading award for the week is 225 tons for a high school in Pennsgrove, Pa.

Boston—Structural fabricating shops in New England have small backlogs. Awards and new inquiry are light. Requirements are limited almost entirely to public works.

Carnegie Steel Co. will furnish approximately 150 tons of grid steel decking for the state bridge, Revere, Mass., over the Boston, Revere Beach & Lynn railroad. Lackawanna Steel Construction Corp., Buffalo, low on the general contract for the superstructure, including the decking, bid 76.5c per square foot in place, including concrete.

New York—Structural steel inquiry includes 3500 tons for the New York Central railroad for bridges at 54th and 65th street, New York, in connection with its west side, Manhattan, program. This work has been held up for several months. New York state highway bridges, closing Dec. 18, and others already bid require close to 1700 tons.

San Francisco—Awards in the week aggregated over 1200 tons and brought the total for the year to 116,359 tons. Bids open Dec. 28 for a wharf extension in Honolulu for the government which calls for more than 250 tons. New inquiries include 3200 tons of sheet steel piling for Government Island, Oakland, Calif. Pending business exceeds 51,000 tons.

Seattle—Subcontract for 1500 tons of shapes, castings and machinery for the Coulee dam, Washington, bridge was taken by Pacific Car & Foundry Co., Seattle, through J. H. Pomeroy & Co., San Francisco, general contractors. Pioneer Construction Co., Seattle, has the official award for the navy hangar at Pearl Harbor, T. H., involving 728 tons of shapes and some reinforcing.

Shape Contracts Placed

1647 tons, 826 tons plain and 821 tons galvanized, eight destroyers, navy yards, Boston, Norfolk, Va., Mare Island, Calif., and Puget Sound, Wash., awarded as follows: Carnegie Steel Co., 180 tons; Phoenix Iron Works, 340; Columbia Steel Co., 168; Bethlehem Steel Co., 128; Joseph T. Ryerson & Son Inc., 240; Jones & Laughlin Steel Corp., 118; Enterprise Galvanizing Co., 282; Joseph P. Cattie, 92; Ross Galvanizing Co., 89; Penn Galvanizing Co., 10.

728 tons, hangar, Pearl Harbor, T. H., specification 7770, to unnamed interest; general contract to Pioneer Construction Co., Seattle.

450 tons, plant alteration, Ford Motor Co., River Rouge, Mich., to Whitehead & Kales Co., Detroit.

425 tons, recreation building, Hibbing, Minn., to American Bridge Co., Pittsburgh.

300 tons, building, Virginia Polytechnic institute, Blacksburg, Va., to Southern Steel Co., Greensboro, N. C.

300 tons, addition units, Crown Cork & Seal Co., Highlandtown plant, Baltimore, to McClintic-Marshall Corp., Bethlehem, Pa.; Consolidated Engineering Co., Baltimore, general contractor.

289 tons, for three submarines for navy department, two at Portsmouth, N. H., and one at Mare Island, Calif., awarded as follows: Carnegie Steel Co., Pittsburgh, 113 tons; Bethlehem Steel Co., Bethlehem, Pa., 101; Phoenix Iron Works, Portland, Oreg., 52, and Illinois Steel Co., Chicago, 20.

240 tons, New York state highway bridge, Elmsford, N. Y., to Harris Structural Steel Co., New York.

225 tons, high school, Pennsgrove, Pa. to McClintic-Marshall Corp., Bethlehem, Pa.

200 tons, school, Long Beach, Calif., to Virginia Bridge & Iron Co., Roanoke, Va.

200 tons, building for Fort Pitt Bedding Co., Pittsburgh, to Fort Pitt Bridge Works, Pittsburgh.

125 tons, one 100-ton and one 25-ton traveling crane, specification 1530, Los Angeles, to unnamed interest.

122 tons, bridge in Sutter county, California, for state, to unnamed interest.

100 tons, bridge, Medford, Minn., to McClintic-Marshall Corp., Bethlehem, Pa.

100 tons, bridge, Denver, to Minneapolis-Moline Power Implement Co., Minneapolis.

100 tons, high-speed line substation, Camden, N. J., to Shoemaker Bridge Co., Pottstown, Pa.; through Turner Construction Co.

Shape Awards Compared

	Tons
Week ended Dec. 8	5,551
Week ended Dec. 1	25,385
Week ended Nov. 24	25,385
This week in 1933	12,568
Weekly average, 1933	9,296
Weekly average, 1934	16,647
Weekly average, November	22,332
Total to date, 1933	723,348
Total to date, 1934	832,392

Shape Contracts Pending

5100 tons, shapes, plates, piling, Muscatine, Iowa, dam; Central Engineering Co., Davenport, Iowa, low for general contract. R. C. Mahon Co., Detroit, low for fabricated steel.

3500 tons, bridges, New York Central railroad, west side, Manhattan, New York, program.

2600 tons, contract No. 5, Golden Gate bridge, San Francisco; Judson-Pacific Co., San Francisco, low.

1660 tons, two Oklahoma state highway bridges; 1100 tons in one bridge over Arkansas river at Ralston, Okla., and 560 tons in bridge over Cimmaron river at Walters, Okla.; bids taken.

1500 tons, state bridges, New York, closing Dec. 18.

1000 tons, dam No. 5-A, Winona, Minn.

900 tons, mainly pier 38, New York Dock Co., Brooklyn; bids in.

700 tons, piling for shore protection, Lucas county, Ohio; project contemplated for spring, if FERA approves.

550 tons, state bridge, Passaic and Morris counties, New Jersey; bids Dec. 27.

547 tons, state bridge, route 23, section 12C, Pompton river, Passaic and Morris counties, New Jersey; bids Dec. 27 to state highway commission, Trenton N. J.

540 tons, four bridge spans for intake towers, Boulder dam, Boulder City, Nev.; Duffin Iron Co., Chicago, low bidder.

300 tons, infirmary building, state hospital, Taunton, Mass.; bids Dec. 11.

300 tons, postoffice, Abilene, Tex.
250 tons, wharf, Honolulu, T. H., for government; bids Dec. 28.
240 tons, bridge over Erie railroad, route 23, New Jersey; bids Dec. 17.
165 tons, state bridge, Armstrong county, Pennsylvania; bids Dec. 14.
150 tons, bridge, Hamilton, Mich.
125 tons, county bridge, Austin, O.; bids Dec. 14.
125 tons, state work; bids to Ohio highway commission, Columbus, Dec. 7 to 15; includes 100 tons for bridge at Barnesville, O.
100 tons, extension to berth 177, harbor department, Los Angeles; bids Dec. 12.
100 tons, prison building, Folsom, Calif.; bids opened.

Reinforcing

Reinforcing Bar Prices, Page 63

Pittsburgh — Pennsylvania state highway lettings have resumed, with inquiries now out for work in five counties to be bid Dec. 14. A Youngstown O., interest is expected to furnish reinforcing bars amounting to about 800 tons for Georgia state penitentiary work through Struck Construction Co., Louisville, Ky. The new billet steel market holds at 2.05c, Pittsburgh, on cut lengths, with rail steel 1.90c, base Pittsburgh.

Cleveland—Several jobs, requiring a total of about 500 tons of concrete bars, are pending for early award, probably before Jan. 1 when the 3 per cent Ohio sales tax goes in effect. The current list of projects issued by the Ohio highway department, Columbus, calls for 125 tons of reinforcing bars. The Cleveland Trust Co. purchased a small lot for a safety deposit vault.

Chicago—Few large lots of reinforcing bars are pending in this district. Low bidder for the general contract for the Hammond, Ind., filter plant has been announced and 1000 tons of bars for this work is expected to be placed soon. Illinois has taken bids on several hundred tons for road work, part of which is to be placed shortly. General contract for the Muscatine, Iowa, dam, requiring 1250 tons of bars, is expected to go to Central Engineering Co., Davenport, Iowa, low bidder. Plans for the Guttenberg, Iowa, dam, requiring a similar tonnage are due soon.

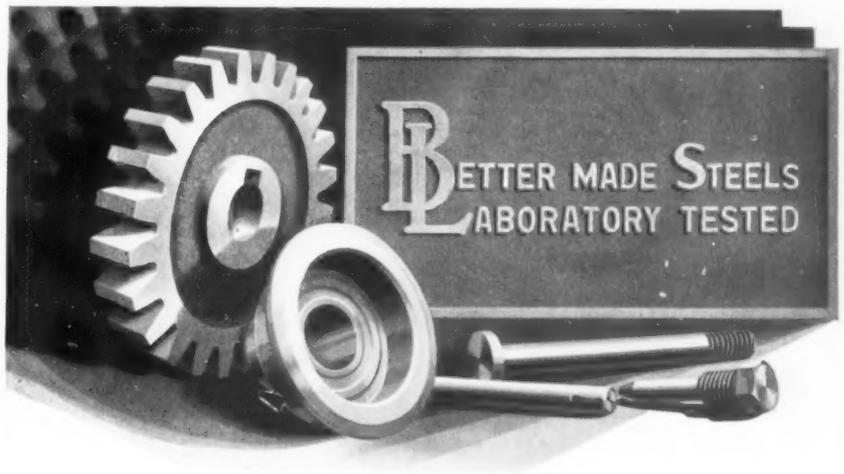
Boston — Small bridge awards total close to 200 tons in the New England district. New inquiry is light, but includes several hundred tons for buildings at the veterans' home, Tougas, Me., bids Jan. 3. Highway requirements have declined to a low point.

New York—Small-lot volume is more active, also inquiry, notably for highway mesh, but buyers are slow to close on several sizable pending projects. Additional bridge requirements for New Jersey, 160 tons, Dec. 27, bring active tonnage in that state close to 1500 tons, while 500 tons, mainly mesh, pend for New York state highway work.

San Francisco—Awards were the largest for any week in over a month and aggregated 1288 tons, bringing the total for the year to 97,576 tons.

Concrete Awards Compared

	Tons
Week ended Dec. 8	2,230
Week ended Dec. 1	1,997
Week ended Nov. 24	1,697
This week in 1933	2,843
Weekly average for 1933	3,232
Weekly average, 1934	2,843
Weekly average, November	1,695
Total to date, 1933	174,788
Total to date, 1934	209,051



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As a result, service hazards have been eliminated, machining costs reduced, and a tougher gear now made than ever produced from forgings.

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Truscon Steel Co., Los Angeles, secured 211 tons for the Garfield school, Pasadena, Calif. Bids will be opened on Dec. 20 for contracts No. 15 and No. 15-A, San Francisco-Oakland bridge, calling for 2175 tons and 1125 tons of reinforcing bars, respectively. The Hall of Records, Oakland, Calif., up for figures Dec. 12, will require 1000 tons. Los Angeles has opened bids, under specification 82, for 4286 tons.

Seattle — Seattle will call bids within 30 days for completion of the city light tower, requiring about 200 tons. Road work, while active, is calling for only small tonnages of concrete bars. Bureau of roads, Portland, Oreg., has awarded four jobs in Washington, Oregon and Montana requiring unstated tonnages.

Reinforcing Steel Awards

600 tons, Joseph E. Seagram distillery building at Lawrenceburg, Ind., to Pollak Steel Co., Cincinnati, through J. & E. Warm Co., general contractors, Cincinnati.

315 tons, bridge, Dallas, Tex., to Mosher Steel & Machinery Co., Dallas; through Austin Bridge & Roads Co., Austin, Tex.

211 tons, Garfield school, Pasadena, Calif., to Truscon Steel Co., Los Angeles.

200 tons, high school, Watts, Calif., to unnamed interest.

150 tons, chapel, St. Paul's cathedral, Figuerora street, Los Angeles, to unnamed interest.

125 tons, sewer, section E-1, Yonkers, N. Y., Westchester county sanitary sewer commission, to Kalman Steel Corp., Bethlehem, Pa.; Inter-county Construction Co., Rye, N. Y., general contractor.

121 tons, building, for Jefferson junior high school, Long Beach, Calif., to unnamed interest.

108 tons, Chicago sanitary district work, Lockport, Ill., to Concrete Engineering Co., Chicago.

100 tons, school, Port Jefferson, N. Y., to Kalman Steel Corp., Bethlehem, Pa.

100 tons, Fairport, O., waterworks and intake; 90 tons of reinforcing bars to Concrete Steel Co., New York; 10 tons of shapes to Fort Pitt Bridge Works, Pittsburgh.

100 tons, Bridge street bridge, Los Angeles, to unnamed interest.

100 tons, alteration, Polytechnic high school, Long Beach, Calif., to unnamed interest.

Reinforcing Steel Pending

4286 tons, specification 82, metropolitan water district, Los Angeles; bids opened.

2400 tons, dam for Tennessee valley authority near Sheffield, Ala.; bids opened Dec. 7 at Knoxville, Tenn.

2175 tons, contract No. 15, San Francisco-Oakland bridge, San Francisco; bids Dec. 20.

1250 tons, dam, Muscatine, Iowa; Central Engineering Co., Davenport, Iowa, low for general contract.

1125 tons, contract No. 15-A, San Francisco-Oakland bridge, San Francisco; bids Dec. 20.

1000 tons, Hall of Records, Oakland, Calif.; bids Dec. 12.

1000 tons, filter plant, Hammond, Ind.; A. C. Proudfoot Construction Co., Hammond, low for general contract.

800 tons, Georgia state penitentiary work; Struck Construction Co., Louisville, Ky., general contractor.

625 tons, piers, Triboro bridge, Randalls Island and Little Hell Gate, New York; Rogers & Haggerty Co., low.

518 tons, dams for Santa Clara valley water conservation district, San Jose, Calif.; bids Dec. 14.

200 tons, Visitation valley school, San Francisco; bids Dec. 5.

200 tons, Lawton school, San Francisco; bids Dec. 26.

165 tons, Panama, schedule 3016; bids Dec. 11.

160 tons, five-span state bridge, route 23, section 12C, Pompton river, Passaic and Morris counties, New Jersey; bids Dec. 27, to state highway commission, Trenton, N. J.

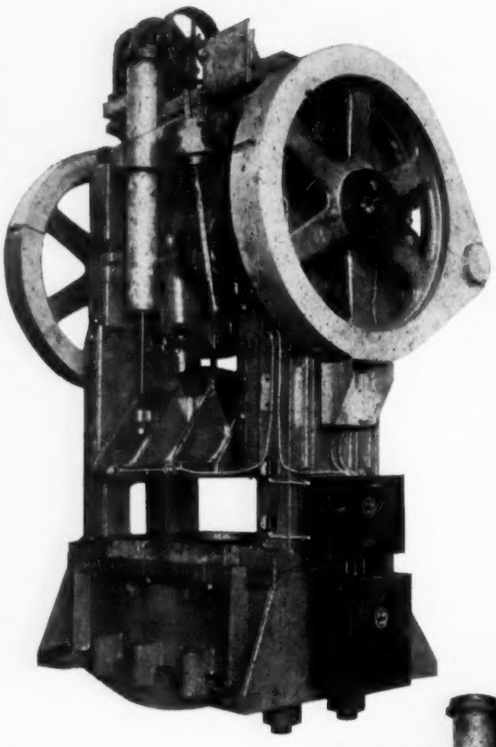
128 tons, debris dam, Grand Canyon, Glendale, Calif., for Los Angeles county; bids Dec. 10.

125 tons, three state bridges; bids to Ohio highway commission, Columbus, Dec. 7 to 15.

125 tons, school, Sebastopol, Calif.; bids opened.

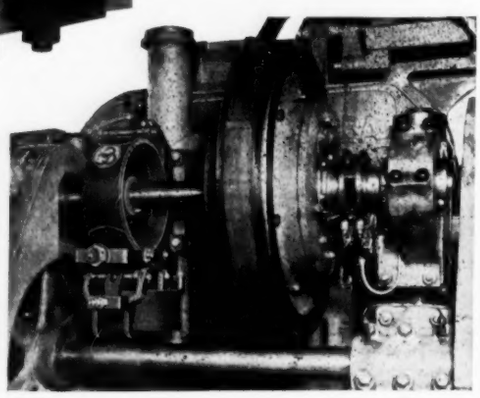
116 tons, noncommission officers' quarters, France Field, C. Z.; bids opened.

New Power Press Control Insures Safety



Safety to the operator is one of the main features of the automatic electric control operation of power presses developed by Clark Controller through the use of automatic control panel and electric brake. The power unit actually running the press has no connection with this control unit.

The safety feature is the non-repeat control system of operating the press. The installation illustrated is on a Niagara press although the same unit could be applied to any similar press. Patent pending.



Above illustration is complete view of press showing the automatic control panel while view at the right shows the electric brake unit.

THE CLARK CONTROLLER CO.
1146 East 152nd St.
Cleveland, Ohio

100 tons, Feather river bridge, Plumas county, California, for state; bids Dec. 19.

Unstated tonnage, Tappan dam for Muskingum river watershed, Ohio; Sammon-Robertson Co., Zanesville, O., low at $387,450.

Pipe

Pipe Prices, Page 63

Pittsburgh — Inquiries for 480 lengths of 28-inch steel pipe, each 12 feet 10 inches, are out from the Kansas City army engineers. The pipe will be bid to this buyer Dec. 12 for delivery to Wiota, Mont., to be used in building the Fort Peck reservoir dam. Bids will be taken at the same time on 1000 pipe connecting links for the same project.

Cleveland—Public work in Ohio depending on government loans is developing with extreme slowness, and is offering little demand for pipe. The only feature in steel pipe here is moderate improvement in jobbers' requirements.

Chicago—Placing of cast iron pipe for PWA projects lacks acceleration and bookings recently have continued light. Advent of cold weather dims hopes for the starting of work on a considerable number of projects under consideration earlier this year. Activity in steel line pipe is quiet with few large oil or gas projects in prospect. Shawnee, Okla., will purchase 1800 tons of 20 and 27-inch pipe for a water line.

Boston—Cast pipe buying is in small lots, although several hundred tons have been placed with the Burlington, N. J., foundry for Newton, Mass., and a filtration plant, Fields' Point, Providence, R. I. Merchant steel pipe has held better than expected in view of light building operations, although larger diameter steel pipe inquiry is lacking.

New York—Part of the 1100 tons of cast pipe for White Plains, N. Y., has been placed through a contractor with the Emaus, Pa., foundry. The same municipality has direct bids on 160 tons, 6 and 8-inch class C cast pipe, closing Dec. 7. Yonkers, N. Y., is expected out shortly for 3400 tons. Except for this Westchester county activity, buying is light and in small lots.

Philadelphia — Steel pipe operations in this district have improved further, with an accompanying increase in demand for skelp.

Washington—Inquiry for cast pipe from the department of interior division of subsistence homesteads, is beginning to appear, bids being asked on several hundred tons, while United States Pipe & Foundry Co. is low on about 100 tons for the Tygart valley homestead project, W. Va.

Birmingham—While manufacturers are reticent as to new business, business warrants steady production with prospects bright for continued output and shipment over the winter.

San Francisco — Cast iron pipe buying is in small lots and awards are limited to lots of less than 100 tons. Plans have been completed for water system improvements in three cities in Utah which will require over 950 tons. It is doubtful, though, that the material will be purchased this year. Movement of standard pipe is inactive. Stocks in warehouses are well rounded.

Seattle—No improvement is expected until the turn of the year, municipalities being unable to finance present needs. Business is in small

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ECONOMY - - Low initial cost. Dependable service.

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General Offices—Parkersburg, W. Va.

Branch Offices — Pittsburgh, Pa., San Francisco, Cal., Memphis, Tenn. Charlotte, N. C. and Roanoke, Va.

lots out of stock, no specifications of size being up.

Cast Pipe Placed

450 tons, 6 to 20-inch, Baltimore, to United States Pipe & Foundry Co., Burlington, N. J.

350 tons, 12-inch, Cook county infirmary, Oak Forest, Ill., to James B. Clow & Sons, Chicago.

350 tons, 12-inch, Washington, to Lynchburg Foundry Co., Lynchburg, Va.; Rudisill Foundry Co. awarded cast iron pipe specials.

304 tons, water system improvement, Newburg, Oreg., to Beall Tank & Pipe Co., Portland, Oreg.

225 tons, Wayne, Mich., to James B. Clow & Sons, Chicago.

150 tons, Valparaiso, Ind., to James B. Clow & Sons, Chicago.

115 tons, 20-inch, White Plains, N. Y., to Donaldson Iron Works, Emaus, Pa.

Unstated tonnage, 12,040 feet of 10-inch, state hospital, Mendota, Wis., to United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

3400 tons, 8 to 30-inch, Yonkers, N. Y.; specifications out soon.

1525 tons, 24-inch and under, mostly 8-inch, bell and spigot, sewer construction, Arlington county, Virginia; bids Dec. 13 with county board.

512 tons, 2 to 8-inch, class 150, Spring City, Utah; bids soon.

385 tons, 4 to 8-inch, Pecos, Tex.

350 tons, 8-inch and under, Mansfield, Ark.; bids Dec. 14.

260 tons, improvement El Cajon avenue, San Diego, Calif.; bids soon.

250 tons, 8-inch, class 150, Gunnison, Utah; bids soon.

247 tons, 6-inch, class 150, Centerville, Calif.; bids soon.

227 tons, 4 to 8-inch, class 150, Santa Monica, Calif.; bids in.

201 tons, 3-inch, class 150, Wellington, Utah; bids soon.

160 tons, 6 and 8-inch, White Plains, N. Y.; bids in.

126 tons, 4 to 10-inch, class 150, Porterville, Calif.; bids soon.

Unstated tonnage, water system, Hot Springs, Mont.; $38,000 of PWA funds allotted; bids Dec. 10, T. A. Tashereau, Kalispell, Mont., engineer.

Unstated tonnage, 22,000 feet of 5½ or 6-inch, Oceanlake water district, 628 Railway Exchange building, Portland, Oreg.; bids Dec. 10.

Unstated tonnage, water system for 60 subsistence homesteads near Longview, Wash.; general contract to West Coast Construction Co., Seattle.

Steel Pipe Pending

1800 tons, 20 and 27-inch water pipe, Shawnee, Okla.

Unstated tonnage, 480 lengths of 28-inch, each 12 feet 10 inches, Fort Peck reservoir dam, Wiota, Mont.; bids to Kansas City army engineers, Dec. 12, including bids on 1000 connecting links.

BENEATH the cloud-reflected glare of the blast furnaces, wherever molten steel is poured, there is usually one or more Morgan cranes at work on which the efficiency and dependability of the mill's production hinges. All Morgan cranes are designed with safety first paramount, a fact that has been no small factor in the building of the reputation for Morgan engineering integrity. An improvement in design—when it is no longer an experiment—is promptly adopted by Morgan, then and not before. Typical of Morgan dependability are these two 150-ton 54' 3½" span four-girder Ladle Cranes in the pouring aisle of a modern steel mill.

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Wire

Wire Prices, Page 63

Pittsburgh — The manufacturing trade has been improving its volume of specifications for wire products. The market is steady at $2.60, Pittsburgh, for carload lots of wire nails and 2.30c for plain manufacturers' wire. Spring wire makers have been more active and a significant betterment in the merchant market has been re-establishment of the less-carload extra.

Copperweld Steel Co., Glassport, Pa., has been awarded 1,344,000 feet, non-corrosive seven-wire strand, for the U. S. engineer, New Orleans, at 3.03c, delivered.

Cleveland — Manufacturers' and jobbers orders for wire increased moderately, and there were some fairly good sales of wire rods. The customary spring terms on wire fencing have been announced and is developing better buying from rural areas.

Chicago—Wire demand continues to show small gains, business so far this month being slightly heavier than in November. Activity lacks the

anticipatory buying that prevailed a year ago when prices were being advanced, but consumers' stocks will be in better condition at the end of the year than in late 1933. Delays still are encountered in release of large tonnages for automotive consumption, but this development is looked for during the next several weeks. Consumption by certain users of manufacturers' wire holds at a relatively high level but the movement of wire products to jobbers shows little change. Few first quarter contracts are being received.

Boston—Increasing number of small orders, notably from New England buyers is encouraging. There has been little advance covering for next quarter. A fair demand has prevailed for rope, but granite interests, one of largest consumers in this district, are buying less than usual.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 63

Leading bolt and nut producers announced Dec. 6 an advance in their prices by dropping one 10 per cent discount from list, effective immediately and for first quarter. Carriage and machine bolts now are 70-10-10 off, all basing points, instead of 70-10-10-10. The new prices are virtually those in effect two months ago when aggression from small manufacturers led to a general reduction. No change has been announced in hexagon head cap screws and square head set screws. Rivet prices have been extended unchanged for first quarter.

At Cleveland releases from automobile manufacturers have increased substantially, while improvement also is noted in demand from agricultural implement manufacturers. Jobbers' requirements and railroad buying are slow.

Chicago suppliers and producers are receiving few orders from railroads but farm implement manufacturers are taking a fair tonnage. Pittsburgh boltmakers await a better demand for spring production, current demand being light.

Tin Plate

Tin Plate Prices, Page 62

Pittsburgh—An uneven rate of operations continues among the tin plate mills, and although the industry's average holds close to 45 per cent, the leading interest is at 60 per cent with some of the independents are as low as 25 per cent. Canmakers are closing 1935 contracts and some producers are rolling anticipated tonnage at this time. Exports to Japan and South America still are a considerable factor.

Cold Finished

Cold Finished Prices, Page 63

Pittsburgh—Not all first-quarter prices on cold finished bars had been filed up until late last week. Although some producers have announced intent to maintain 2.10c, Pittsburgh base, with due allowance for other basing points, at least one important producer had not yet formally made its price declaration for the coming quarter. However, cold-drawn alloy steel bars are definitely set to continue at 2.95c, Pittsburgh. A large volume of inquiries for cold-finished steel bars is coming mainly from agricultural implement makers but there is lagging interest from the jobbing trade and only spotty interest from the automotive concerns.

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Your own product will be better when you use Newport Electrical Sheets. Made under absolute laboratory control, constantly inspected and tested, the result is electrical sheets of known physical and electrical qualities, lower core losses, less aging and increased permeability.
NEWPORT ELECTRICAL SHEETS
Hot and Cold Rolled Sheets ● Newport Electrical Sheets ● GOHI Pure Iron-Copper Alloy ● Globe Brand Galvanized Sheets ● Kentucky Copper Bearing Steel ● Newport Long Terne Sheets.
ELECTRICAL SHEETS
THE NEWPORT ROLLING MILL CO., NEWPORT, KY.

Pig Iron

Pig Iron Prices, Page 64

Pittsburgh—Some slight pickup is noted in foundry orders, but melters are taking only carload lots. Penn Steel Castings Corp., Chester, Pa., was announced low last week at $8679 on suction swivel elbows for the Fort Peck dam dredges. An order for castings required for 50 new tank cars was taken last week by Pittsburgh Steel Foundry Co., Glassport, Pa., from General American Tank Car Co., Chicago. The Pittsburgh pig iron market is steady on the basis of $18.50, Neville Island, foundry grades, $18.00 on basic and $19.00 for bessemer. Davison Coke & Iron Co. banked its Neville Island, Pa., furnace on Dec. 3, leaving no merchant furnaces active here or in the valley.

Cleveland—Orders for shipments this month and early in the first quarter stepped up briskly during the week, one furnace interest booking 9000 tons, in lots up to 1000 tons. This was one of the best week's tonnage in several months. Few melters have placed contracts covering full quarterly requirements since the code was amended to bar an advance in prices once named for a quarter. Automobile foundries are becoming more active, and stove and range manufacturers continue buying at their recently improved rate. Sellers believe business is due for a more vigorous improvement after the turn of the year. November shipments were 25 per cent larger than October's.

Chicago—Pig iron shipments hold closely to the November rate in contrast to the declining tendency usually apparent at this time. Since deliveries are adjusted to actual requirements, in view of the approach of the inventory period, recent activity gives a favorable picture to foundry operations. Stocks generally are light and heavier shipments are in prospect early next quarter. Contracting for that period already is in excess of bookings placed three months ago for the quarter now ending. Prices continue $18.50, furnace, for No. 2 foundry and malleable.

Boston—Pig iron sales are light with small-lot shipments, frequently by truck, fewer. Protected against price increases for first quarter and with a desire to keep inventory down at the year-end, consumers are generally taking only immediate needs and showing little interest in first quarter. Mostly sold before arrival, 400 tons of Indian iron was landed last week.

New York—Sales of pig iron are spotty, with little change in the total volume over recent weeks. The Troy, N. Y., furnace has been blown out.

Philadelphia—Shipments of pig iron are maintained with little variation from the level of recent weeks. Prices are unchanged.

Cincinnati—Better spot demand for pig iron is increasing shipments for the early part of this month, but stability of prices is counteracting any tonnage contracting for first quarter needs. The melt is fairly steady, the slackening activity in stove foundries being offset to a degree by automotive parts production. Iron requirements for machine tool and agricultural implement manufacturers continue light.

St. Louis—Pig iron buying continues principally in small lots, but the total makes a fair showing and shipments are maintaining the steady improvement which began in September. There has been some inquiry for first quarter and producers expect to close on fair tonnages during the next several weeks. Consumer stocks are light. One favorable development has been a noticeable improvement in specifications on basic iron.

Birmingham, Ala.—While prospects for the first quarter are promising, no sales for that period have been made. Expectations are that surplus stock will be reduced during December.

Seattle—First quarter prices on Columbia pig iron have been announced, unchanged at $17.50, base, Ironton, Utah, 1.75 to 2.25 per cent silicon, making the price delivered Seattle for No. 1 about $23.50. Foundry demand is slow, only plants making specialized items showing any activity.

Toronto, Ont.—Merchant pig iron sales are running in excess of 600 tons per week, most orders in single-car lots for spot delivery.

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Quicksilver

New York—Quicksilver prices are unchanged and the market generally is quiet. Lots of 100 flasks of 76 pounds each are available down to $72.50 a flask, but lots of 15 to 24 flasks, inclusive, are $74.

Scrap

Scrap Prices, Page 65

Pittsburgh—As a rapidly moving scrap market advanced $1.50 per ton last week and No. 1 heavy melting steel for local delivery became quotable at $13.00 to $13.50 a ton, the buying interest of a Wheeling mill completely dominated the situation. The Baltimore & Ohio list was moved to a down-river consumer at close to $14, delivered, and at the same time this railroad sold cast scrap at $11.40, No. 1 wheels at $12.80 and couplers and knuckles at $14.75, all for Pittsburgh delivery. The Pennsylvania railroad scrap is understood to have brought over $14 a ton, an advance of almost $3 a ton from the list of a month ago. Steel wheels and springs were sold to a broker here last week at $15.75. With the local market now definitely heading upward and many brokers talking of a $15 market before Jan. 1, Pittsburgh has been drawing upon eastern supplies which had been diverted to export previously.

Cleveland—Advances of 50 cents to $1.50 per ton have been made on various grades of steel and iron scrap here and in the Valleys, demand for material for shipment as far as Ohio river points carrying the market upward. Little tonnage is moving locally as holders of scrap are slow to sell even at present advanced prices. An important melter in the Youngstown, O., district is accepting scrap freely. Another has not bought tonnage recently and should enter the market soon.

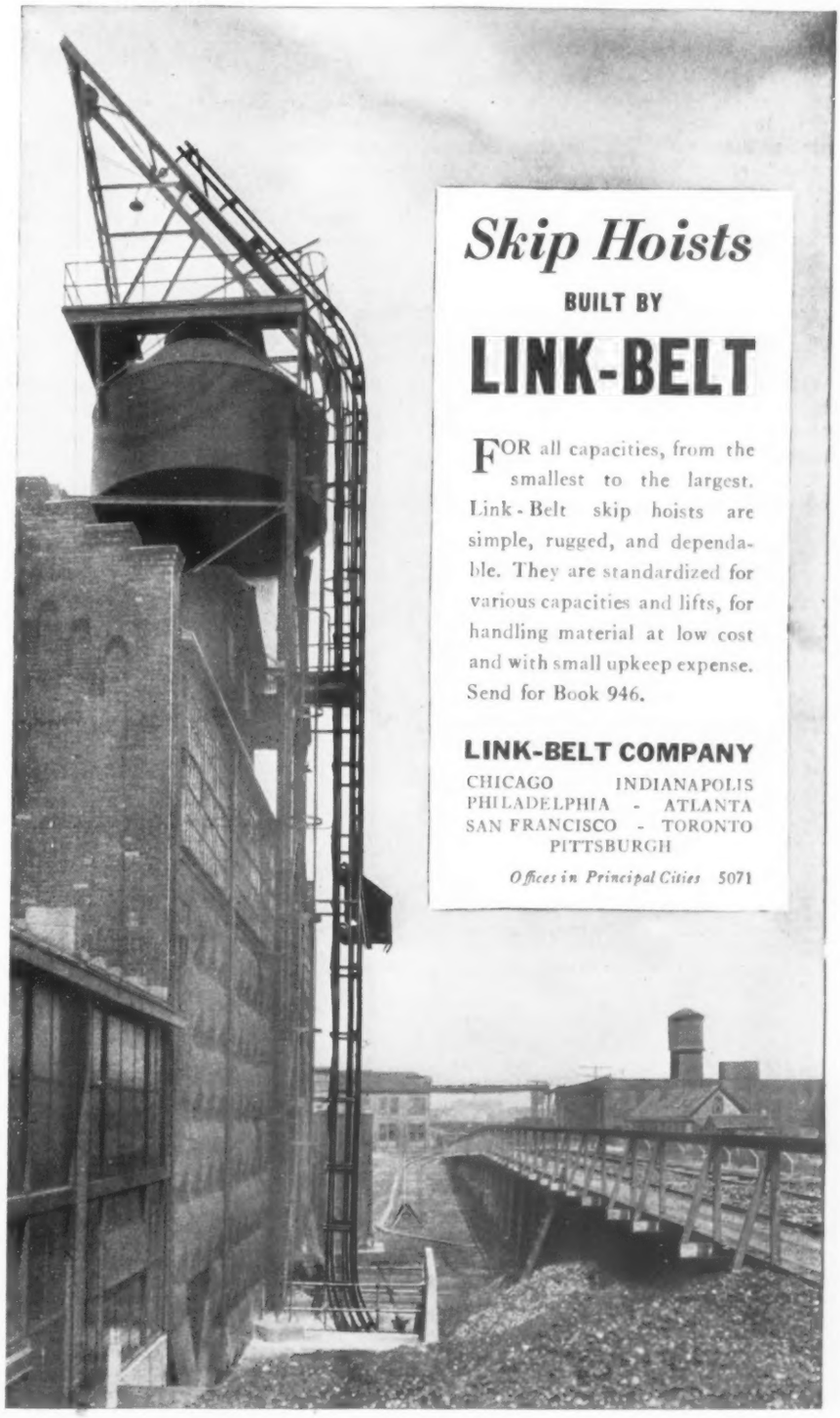
Chicago—Most scrap prices have advanced further, with heavy melting steel up 25 cents, at $9.50 to $10, the highest level since June. A mill sale of heavy melting steel at $10 is reported, while bids on railroad lists have commanded as high as $10.50. Both dealers and railroads have reduced their scrap holdings materially this year and surplus lots generally are absent. Practically all grades have followed the latest price increase in heavy melting steel.

New York—While dealers continue to purchase against export orders, there has been a decline in taking on new foreign business. For heavy melting steel $8.50, barge, is paid for No. 1 and $7 for No. 2. Scrap is coming out less freely. Prices are firm on other grades, but generally unchanged.

Boston—Firmer scrap prices have spread to additional grades and buying for export is more active with material being bought for four cargoes. Shipments to New England consumers are light, but a slightly better movement to outside domestic melters prevails. For export, close to $9, dock, has been paid for scrap rails, but most heavy melting steel buying has been done at unchanged prices. Some No. 1 machinery cast has been bought for export at $8.25, dock.

Detroit—Reflecting stronger price situation in other districts, scrap prices here have advanced 25 to 75 cents a ton. While demand for local consumption continues light, buying activity for outside plants has been brisk.

Philadelphia — Improved activity has appeared in steel and iron scrap, with most grades quoted higher. Phoenix Iron Co., Philadelphia, has been a recent buyer of stove plate and the Pencoyd, Pa., consumer, while taking no steel scrap, has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bought several hundred tons of heavy breakable cast at $10, the market on this grade being unchanged. The advancing domestic market is discouraging export buying although substantial tonnages are moving abroad against old orders.

Cincinnati—Dealer quotations on iron and steel scrap were raised during the past week, reflecting the strong market in nearby districts and reappearance of mill buying interest. However, no tonnage sales were reported, dealers holding material tightly in expectation of further price advances, and wary of selling short.

St. Louis—Purchasing of iron and steel scrap by consumers continues at a low ebb, but the market is strong, influenced by further covering of short contracts and small offerings. Sales consist of small lots for special purposes, all for prompt shipment.

Birmingham, Ala.—Movement of steel and iron scrap is light and prices have undergone no change. Export demand has not reached thus far inland.

Seattle—While the market continues active, Oriental buyers are reluctant to meet higher asking prices. Ocean freights are rising and sellers are quoting c.i.f. prices in line with increased costs. Local consumption is nominal.

Toronto, Ont.—Minor improvement is appearing in iron and steel scrap markets. Local dealers state that shipments are better than a year ago and sales for 1934 are 50 to 100 per cent ahead of last year. While demand continues specialized, more items are active. Prices are steady.

Warehouse

Warehouse Prices, Page 66

Pittsburgh—If warehouse steel shipments continue December will be the third successive month of practically unchanged totals. All warehouse steel prices here are unchanged.

Cleveland—Warehouse sales tonnage has dropped to a lower daily average than in November, which was below that of October. Warehouse sellers will seek to exercise an optional right to absorb or to pass on to the consumer, depending on locality and competitive conditions, the 3 per cent sales tax which will go in effect in Ohio Jan. 1. Though it has passed both houses of the legislature, the bill still is in conference committee.

Chicago—While November showed less than usual seasonal decrease a further drop is anticipated in December. Activity still exceeds that of a year ago.

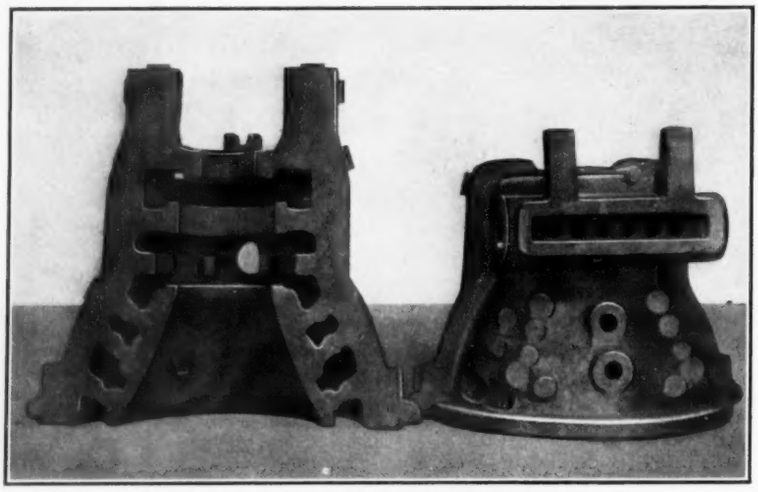
New York—Warehouse volume holds to last month's rate with only slight indications of the usual year-end decline. Numerous well spread small orders account for most of volume. Prices are firm and unchanged.

Cincinnati—Buying from warehouses shows a slight downward trend, probably due to seasonal influences. Prices are unchanged.

St. Louis—Distributors of iron and steel from store report business this month above expectations and fully up to the daily average in November. Purchasing is almost exclusively for immediate needs.

Seattle—Increased warehouse buying in the final week raised November total volume to about that of October. Sheets are moving fairly well, galvanized and black being in demand for repair and stove work.

QUALITY CASTINGS



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Nonferrous Metals

Nonferrous Metal Prices, Page 64, 65

New York—Improved sentiment in the copper market was the outstanding nonferrous development of last week. Sales in the domestic market held up well and were fair in the foreign market. Lead, zinc and antimony quotations were unchanged. Zinc sales declined below the tonnage moved in the preceding week.

Copper—It was proposed abroad to hold a world conference here with January 15 tentatively set as the meeting date. Curtailment of foreign output and international marketing plans would be discussed. Current buying of copper domestically is taken to indicate that consumers' stocks in this country are not excessive and observers look for still better general business activity with the turn of the year. Copper prices were firm on the basis of 9.00c, Connecticut, for electrolytic.

Zinc—Prices were well maintained and no indication of shading developed. The rise of over 5000 tons in refined stocks at the end of November had no immediate bearing on the price structure. Prime western held at 3.70c, East St. Louis, and 4.05c, New York.

Lead—Demand was limited mostly to carlots but the market tone was steady with St. Joseph Lead Co. main-

taining a $1 per ton premium on certain brands sold in the New York market. Prices were unchanged at 3.35c, East St. Louis, and 3.50c, New York. Total lead stocks increased moderately in October, according to the American Bureau of Metal Statistics.

Tin—Straits prices dipped fractionally during the week but later recovered on firmer exchange rates. At the week-end prices were on the basis of around 50.95c for spot. Buying was quiet but the trade's sentiment improved by the statistical showing of the world industry at the end of November.

Antimony—Antimony prices were firmer but buying was held to only a few small lots. The current price of 13.75c to 14.00c, duty paid, is the highest since 1927.

Semifinished

Semifinished Prices, Page 63

Delineation between wire rods and bars has become officially incorporated in steel extras. Wire rods have been defined in two classifications: Common and combination. Common wire rods are those produced only by the double or multiple strand method on a rod mill in sizes of No. 5 gage to 15/32-inch diameter, both inclusive. On straight lengths of sizes over 5/16-inch diameter, these products are bars. Combination wire rods are designated as hot-rolled steel products, round in shape larger than 15/32-inch diameter up to and including 47/64-inch diameter. In straight lengths, these products are bars. Common wire rods have been reaffirmed at $38, Pittsburgh, and combination wire rods have been established at $40, Pittsburgh.

As previously reported, the base on forging quality bloom billets or slabs has been established at 4x4 to 9x9-inch inclusive, or rectangles of equal area.

Base prices on semifinished steel at Pittsburgh are steady and unchanged and demand continues chiefly from the tin and sheet bar rolling mills. Alloy billets, blooms and slabs are quoted $49, Pittsburgh, and uncropped alloy ingots, $40.

Coke By-Products

Coke By-Product Prices, Page 63

New York—Announcement is expected this week on next quarter distillate prices. Meanwhile the seasonal decline in demand for toluol and other distillates has been less than usual. Phenol is steady with demand unchanged. Contracting for naphthalene at recent lower prices continues. Current volume is limited to small spot shipments.

Steel in Europe

Foreign Steel Prices, Page 66

London—(*By Cable*)—The steel trade in Great Britain maintains its recent rate of activity and some orders have been booked for shipment in the second quarter. Continued expansion seems certain and will require additional blast furnace capacity in Middlesbrough before the end of the year. Steelworks are well occupied and shipbuilding orders to Scottish yards show improvement. Tin plate demand is fair. Galvanized sheets are being sold in good tonnages to India.

The Continent reports export trade shows some diminution. Brussels notes a Japanese sheet bar contract lost to an American maker. German makers are booking a considerable tonnage of steel hoops.

Ferroalloys

Ferroalloy Prices, Page 64

Prices of domestic spiegeleisen, 19 to 21 per cent, have been reaffirmed at $26, furnace, on lots up to 50 tons, and $24 on 50 tons or more. Last week at Pittsburgh a large cargo of fluorspar was delivered by water when the FAIRPLAY brought several bargeloads into Pittsburgh steel mills from the southern Indiana mines. Washed gravel fluorspar continues to be delivered in Pittsburgh for around $20 to $21 per net ton, depending upon water or rail shipment.

Here and There In Industry

JOSEPH T. RYERSON & SON INC. is now completing an extension to its Milwaukee plant at 244 South Nineteenth street, which will almost double the former warehousing capacity of this plant. The plant proper has been extended to almost twice

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it's former length. A section of the old warehouse has been insulated and rebuilt with a new central heating system for the storage of special steels. A new two-story modern brick office building with sound deadening ceiling and other improvements has also been erected. The new heating system will provide proper distribution of heat to prevent any condensation of atmospheric moisture spoiling the quality and finish of stock. Many new sizes of structurals, bars, plates and heavy sections are also included. Other Ryerson plants are located at Chicago, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia and Jersey City, N. J.

□ □ □

Production Machine Co., Greenfield, Mass., has bought the business, goodwill and plant of the Peerless Surfacing Machine Co. Inc., Troy, N. Y., and has moved equipment and manufacturing operations to its plant at Greenfield. The product of the Peerless company consists of three vertical and three horizontal types of abrasive belt surfacing machines taking belts of 9, 14 and 20 inches width, and a bench type.

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Republic Steel Corp., Youngstown, O., has appointed three additional warehouse distributors for Enduro stainless steel, as follows: Buhl Sons Co., Detroit; F. W. Heitman Co., Houston, Tex.; Woodward Co., Albany, N. Y. This makes a total of 45 warehouse stocks of this material. Republic also has appointed Steel Products Co., McKees Rocks, Pa., warehouse distributor of Toncan iron sheets in the Pittsburgh area.

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Cadillac Machinery Co., 623 Fisher building, Detroit, has been appointed representative in Detroit territory for the DeVlieg Milling Machine Co., Jackson, Mich.

□ □ □

Consolidated Steel Warehouse Co., Tioga and Janney streets, Philadelphia, has been organized by K. B. L. Fielding, Margate, N. J., Joseph Fielding, Coral Gables, Fla., and R. L. Whitehill, 733 West Fisher avenue, Philadelphia.

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Rieke Metal Products Corp., Auburn, Ind., manufacturer of a device for placing hermetic caps on steel oil drums, has established a branch factory in Spain. It has contracts from Belgium, Germany and England, and sells extensively in South America.

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Keen Foundry Co. Inc., Griffith, Ind., has changed its capital stock from $40,000 to $100,000. The same officers were re-elected as follows: President, L. E. Keen, vice president and secretary, A. M. Keen, treasurer, S. M. Beiriger.

□ □ □

F. J. Schwabe & Son, Fort Wayne, Ind., manufacturer of wood and metal patterns, recently has reorganized as the Schwabe Pattern Co. Inc. The officers are: President and treasurer, R. J. Schwabe; first vice president, Mrs. A. B. Schwabe; second vice president, Miss Ruth E. Schwabe; secretary, Virgil Eisenhut.

□ □ □

Welding Engineering Sales Corp., 110 East Forty-second street, New York, will serve as agent for the General Electric Co., Schenectady, N. Y., in the sale of welding machines, electrodes and accessories in New York state, New England and northern New Jersey. The company at present has sales representation and warehouses in Buffalo, Syracuse, N. Y., and Boston.

□ □ □

Macwhyte Co., Kenosha, Wis., manufacturer of wire rope, elevator cable and other standard forms, including preformed and internally lubricated rope, has appointed Betz-Pierce Co., Cleveland, its distributor in Cleveland territory. Stock will be carried in a wide range of sizes, grades and construction. The latter is adding wire rope to its previous stock of warehouse steel, steel and

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Steelblast Abrasives Co., Cleveland, has appointed M. A. Bell Co., St. Louis, to handle the sale of the company's metallic abrasives in the St. Louis area, and George F. Pettinos Inc., Philadelphia, in Pennsylvania, New Jersey and Delaware.

NRA

(*Concluded from Page* 18)

rington Co., Philadelphia; L. D. Cull, David Round & Son, Cleveland; C. S. Neumann, Union Mfg. Co., New Britain, Conn.; J. C. Morgan, Yale & Towne Mfg. Co., Philadelphia; A. P. Van Schaick, Wright Mfg. Division, American Chain Co., Bridgeport, Conn.

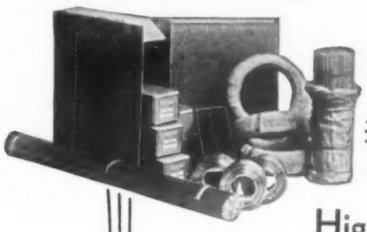
Tubular split and outside pronged rivet manufacturing industry (A division of the fabricated metal products industry): Conditional approval given procedure plans; Committee to consist of the following supplementary code authority members: F. H. Merwin, Milford, Conn.; J. A. Morrissey, Cicero, Ill.; William P. Bartel, Waltham, Mass.; John Marshall, Boston; and William Fleming Jr., Waupun, Wis.

Sheet metal distributing trade, a division of the wholesale trade, is proposing that the limitation of "not more than three members" for each of its regional committees be removed.

Equipment

Pittsburgh—Lewis Foundry & Machine Co., Coraopolis, Pa., subsidiary of Blaw-Knox Co., Pittsburgh, last week received an order from a Japanese steel company for a 68-inch, 3-high rolling mill complete with tables, motor and controls to be used for rolling sheet steel and having a capacity of approximately 70 tons of 16-gage sheets per eight-hour shift. The mill will be driven by a 500-horsepower electric motor. Delivery is expected to be made in February or March. At the same time, new inquiries appeared last week from several other Japanese steel producers—one inquiry being for a rougher and two 3-high sheet mills, whereas another prominent request for prices came from a Japanese concern which expects to buy a plate mill. Another pending inquiry from Japan is for a continuous strip mill. Furthermore, Russian inquiries, mainly for 4-high mills, are continuing to be of promise. Purchase of either a 60 or 66-inch continuous hot strip mill for the Lackawanna, N. Y., plant of Bethlehem Steel Co. is expected to be made sometime around Jan. 1, when appropriations will be issued. This inquiry has been before the steel mill equipment trade for some time and promise of an early closing is encouraging.

Boston—While a good part of the slightly heavier inquiry being figured is not expected to be placed until after Jan. 1, the total volume of business placed with New England equipment builders is slightly improved. Operating schedules in several metalworking plants are up slightly or maintaining fairly high schedules, notably chainmaking plants, textile mill equipment builders, on parts, and valve and fitting shops. A Worcester, Mass., builder of grinders has a three months backlog at present operations following



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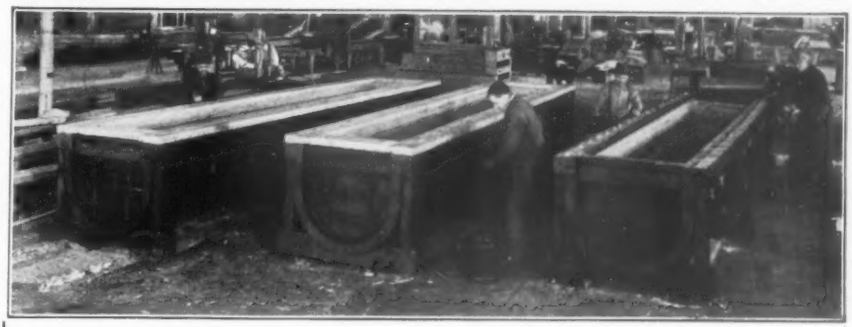

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New York—Several of the largest machine tool dealers in this district note a slight increase in orders thus far in December as compared with the previous month. An encouraging factor is an improved volume with private industry, although this business has been for widely scattered requirements with no one industry placing large orders. The bulk of the large volume of machinery for government arsenal shops, on which bids are in, is expected to be placed before the end of the year. While some contracts have been placed against bids for several hundred tools for New York technical schools, a few inquiries will be readvertised.

Chicago—Part of recent quietness in equipment sales is ascribed to seasonal influences, and the outlook for early 1935 generally is regarded as more favorable. Steel mills for the past year have concentrated plant improvements in rolling divisions and there is little indication of major activity in the steelmaking divisions. While ordinary repair work has continued, there has been a general lack of activity in rebuilding or improving such facilities. Machine tool inquiries show little change and sales are slow although some users expect to close on pending work next quarter.

Washington—In the past three weeks the army ordnance department has placed numerous contracts for machine tools, furnaces and other equipment. Among companies awarded business on an opening totaling $479,215.46, to an amount of over $20,000 are: Acme Machine Tool Co., $28,677; Brown & Sharpe Mfg. Co., $72,219; Cincinnati Bickford Tool Co., $23,505; Cleveland Automatic Machine Co., $33,938; Gisholt Machine Co., $43,390; Pratt & Whitney Co., $34,419; Surface Combustion Corp., $30,921; and Warner & Swasey Co., $40,956. Forty-five companies participated in the business.

Construction and Enterprise

New England

FARMINGTON, CONN.—Town is preparing plans for constructing a disposal plant, and a pumping station, to cost approximately $100,000. Henry Robinson Buck Inc., 650 Main street, Hartford, Conn., engineer.

WINCHENDON, MASS.—Town has appointed R. E. Smith chairman of a special commission to make a preliminary survey for extension to water supply system. Fay, Spofford & Thorndike, 44 School street, Boston, engineer.

Pennsylvania

BARKING STATION, PA.—Hillman Coal & Coke Co., First National building, Pittsburgh, will reconstruct a tipple pier and mooring pile clusters at its river mine here.

DENBO, PA.—Vesta Coal Co., subsidiary of Jones & Laughlin Steel Corp., Jones & Laughlin building, Pittsburgh, will improve its river landing at mine No. 6 near here. Four pile clusters will be constructed.

PITTSBURGH—Department of public works, contract clerk, room 429, City-County building, will open proposals Dec. 18 for furnishing and installing motor-driven pumping units and appurtenances at Lincoln, Saline, Highland and Herron Hill pumping stations.

Ohio

CARDINGTON, O.—Village is preparing plans for waterworks system to include 100-foot steel elevated tank of 100,000-gallon capacity, and pumping station. Estimated cost $40,000. Jennings-Lawrence Co., 12 North Third street, Columbus, O., engineer.

GERMANTOWN, O. — Germantown Distilling Co., recently organized, care of Walker & Norwalk, American building, Dayton, O., plans a 1-story power house at proposed new distilling plant, where electric power equipment will be installed. Cost is estimated at $90,000.

JAMESTOWN, O.—Board of public affairs has plans completed for waterworks system, including pumping station, elevated tank and distribution lines, to cost about $58,000. H. Collins Wight, Union Trust building, Dayton, O., engineer.

SPRINGFIELD, O. — International Harvester Co., 606 South Michigan avenue, Chicago, plans installation of motors and controls, conveyors, electric hoists, etc., in new factory, 65 x 400 feet, here. Cost close to $100,000.

TOLEDO, O.—Closure Service Co., manufacturer of bottle caps, stoppers, etc., affiliated with Owens-Illinois Glass Co., Toledo, O., plans installation of motors and controls, conveyors and other equipment in new multi-unit plant, comprising former local works of Toledo Bridge & Crane Co., now being acquired. Cost over $100,000.

YOUNGSTOWN, O.—Republic Steel Corp., R. J. Wysor, vice president in charge of operations, is installing additional finishing equipment in its electric weld tube mills here, and erecting a new building in which to house the equipment and provide additional storage space for the finished pipe. Estimated cost of building and equipment is $700,000.

Michigan

COLON, MICH.—Town has been allotted PWA loan and grant of $48,000 for construction of waterworks system.

DETROIT—Peerless Steel Products Co. Inc. has been incorporated by Milton Simon, 546 New Center building, to deal in steel.

DETROIT—Sanidraft Pump Co. Inc., 8520 West Vernor highway, has been formed to manufacture pumps, by Al J. Stock, 9040 Dawes avenue.

DETROIT—Electrical Appliances Mfg. Co. has been incorporated with $50,000 capital to deal in electrical equipment, by O. Adelman, 3010 Barlum tower.

DETROIT—Michigan Forging Co., 4000 West Jefferson avenue, has been incorporated with $60,000 capital to manufacture forgings, by Robert J. Gilmore, 509 Westmoreland, Lansing, Mich.

GRAND HAVEN, MICH.—Hamilton & Weever, Grand Rapids, Mich., consulting engineers, are preparing revised plans for additions and alterations to the municipal power plant at Grand Haven. Estimated cost is $70,000.

GRAND RAPIDS, MICH. — Norge Corp., manufacturer of electric refrigerators, plans installation of power equipment, mechanical handling and other machinery in a new 1-story fac-

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We Serve Industrial as Well as Railroad Needs
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tory addition, 100 x 300 feet. Cost over $50,000.

JACKSON, MICH.—City manager will open bids Dec. 20 for construction of sewage disposal plant, to be financed with aid of PWA funds.

SAULT STE. MARIE, MICH.—Kaine Boiler & Machine Works, John T. Kaine, manager, will soon start construction of a new 1-story boiler and machine shop, 40 x 60 feet.

TECUMSEH, MICH.—Carson Foundry & Mfg. Co. has been organized to manufacture metal castings, by D. J. Carson, Tecumseh, Mich.

Indiana

EVANSVILLE, IND. — Shear-Klean Grate Co. Inc., 400 Northwest First street, has been formed to manufacture grates and steel and iron building materials, by Henry F. Koch, also named resident agent, Minnie Koch and Walter J. Stumpf.

PRINCETON, IND.—City, O. T. Brazelton, mayor, will soon take bids on sewage treatment plant, including pumping equipment, tanks, filters, etc. Estimated cost $110,000. Babcock & Finch, 276 Century building, Indianapolis, engineers.

TERRE HAUTE, IND.—Wabash Boiler & Conveyor Co., Eleventh and Cherry streets, is constructing an addition to its factory.

Illinois

CHICAGO—Continental Iron & Metal Co. has succeeded to the Diamond Iron & Metal Co., 1560 North Sheffield avenue, and will maintain operations at that address.

CHICAGO—Krone Die Casting Co., 10 South LaSalle street, has been formed by W. F. Mayer, E. B. Patterson and J. M. Daugherty, to deal in dies and die castings, metal stampings and metal and wood products. Correspondent: Winston & Mayer, 1040 Otis building.

CHICAGO—Vitavox Co., 557 West Jackson boulevard, has been incorporated to deal in machinery and electrical and mechanical devices, by R. N. Ferrington, Edward Toppel and Robert V. Kortum. Correspondent: William C. Moody, 7 South Dearborn street, suite 1612.

CHICAGO — Stanley Steam Motors Corp., 333 North Michigan avenue, has been formed to manufacture steam-propelled busses and trucks. The company proposes to manufacture its own motive power but to purchase chassis, springs, axles, wheels and other assembly units.

ELGIN, ILL.—Illinois Watch Case Co., Dundee avenue, plans installation of electric power equipment in a 2-story addition to plant. Cost is estimated at $150,000. L. C. Eppenstein, president.

Alabama

BIRMINGHAM, ALA.—Hill & Griffith Co., Thirtieth street and Sixth avenue, manufacturer of foundry facings and supplies, recently sustained damage by fire.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will open bids Dec. 11, on portable electric drills and grinders.

Kentucky

BARDSTOWN, KY.—Green Brier Distillery and Hobbs Distillery, recently organized by Chicago interests as affiliated concerns, care of Paul Gerhardt, 64 West Randolph street, Chicago, architect, plan installation of electric power equipment and construction of steam power plants at proposed new plants here. Each distillery will cost about $250,000.

LOUISVILLE, KY.—Bernheim Distilling Co., Leo Gerngros vice president, has acquired a tract of land between Arbegust and Breckenridge streets for possible expansion.

Louisiana

NEW ORLEANS—North American Distillers Inc., Edwin Lehmann president, Peoria, Ill., is converting the old central plant of United States Industrial Alcohol Corp., 200 Broadway, into a distillery; will expend about $20,000.

North Carolina

GRAHAM, N. C.—Joseph R. Morton & Co. Inc., recently organized, plans installation of motors and other electric

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New York Tulsa

GRAVER

power equipment in new 2-story silk mill. Estimated cost $180,000.

Tennessee

BRISTOL, TENN.—East Tennessee Light & Power Co., 300 State street, plans repairs to burned gas plant and will erect a boiler house and retort house, 35 x 50 feet. Two 100-horsepower boilers with stokers and auxiliary equipment will be installed. Cost of building, including equipment, $20,000.

KNOXVILLE, TENN.—Cumberland Brewing Co. has been incorporated with $750,000 capital, by W. B. Carlton and L. L. Winterman, 3155 Russell street, both of St. Louis. A 6-story building recently purchased will be remodeled and machinery installed for brewery of 100,000-barrel capacity. About $200,000 will be expended.

West Virginia

WELCH, W. VA.—Bright & Davis Lumber Co., McDowell street, is erecting a planing mill and storage plant, 70 x 100 feet.

Virginia

LYNCHBURG, VA. — Appalachian Electric Power Co. is planning to erect a 2000-kilowatt substation at Fifteenth street and Tilden avenue, and will also build a $42,000 transmission line from Blackwater creek. John Early Jackson, local manager.

Missouri

PERRY, MO.—City has voted $43,000 bonds for waterworks system. W. B. Rollins & Co., engineer, 339 Railway Exchange building, Kansas City, Mo.

MONROE CITY, MO.—City is considering electric power plant improvements.

Oklahoma

OKMULGEE, OKLA.—Iverson Tool Co. has acquired the Superior Pipe & Supply Co.

TULSA, OKLA.—Honest Tools Inc. has been formed with $25,000 capital by Russell R. Hays and Howell E. Hays.

TULSA, OKLA.—Penoco Oil Co., owned and operated by Ray McBride and Ed Chism, has begun work on a warehouse and bulk plant.

Texas

BRECKENRIDGE, TEX.—Brazos river conservation and reclamation district, care of state board of water engineers, Austin, Tex., plans large hydroelectric power and irrigation project in district of Brazos river and tributaries, comprising series of 12 dams, of which 7 will be used for hydroelectric power stations. Project will include transmission lines, power substations and switching stations. Fund of $50,000,000 is being arranged through federal aid.

CORSICANA, TEX.—Nicholson Creamery plans enlarging its plant; will erect sheet iron building, 30 x 72 feet, to house truck loading platform, can washing and machine and workshop.

MANON, TEX.—City, care of W. H. Wentland, mayor, plans waterworks system, including tanks, pumping station, to cost about $42,000. PWA loan and grant approved. M. C. St. John, 1406 Esperson building, Houston, Tex., engineer.

ORANGE, TEX.—Sabine Furniture Mfg. Co. has leased and will remodel building for furniture plant and will install machinery.

PLAINVIEW, TEX.—City has applied to PWA for allocation of $423,300 for establishing light plant.

RAYMONDVILLE, TEX. — Willacy county water control and improvement district No. 1, C. S. Clark, clerk, has plans under way for new irrigation and water supply system, including central generating plant and group of electric power stations for power service for pumping operations. Will ask bids in near future on equipment. Fund of $4,853,000 is being secured through federal aid.

RICHMOND, TEX.—City will soon take bids for waterworks, including water well and turbine pump, pump house, service pump and motors, 50,000-gallon surface reservoir, cast iron pipe, valves and boxes. David M. Duller, 1618 Second National bank building, Houston, Tex., consulting engineer.

SAN MARCOS, TEX.—Texas Power & Light Co., Lee McWilliams, manager, is contemplating erecting three additional cold storage compartments at local plant, each 20 x 20 x 35 feet, equipped with modern equipment.

Wisconsin

LA CROSSE, WIS.—G. Heilman Brewing Co., 1027 South Third street, has awarded a contract for construction of a fermenting building, 13 x 116 feet, and will install new fermenting equipment.

MANITOWOC, WIS.—Eastman Mfg. Co., North Eleventh street, manufacturer of hose couplings, etc., is remodeling and enlarging its factory in order to increase production facilities.

SOLON SPRINGS, WIS.—Dahlberg Light & Power Co. plans installation of a new turbine at Gordon dam near Solon Springs.

Minnesota

BEMIDJI, MINN.—City plans construction of an airplane hangar, 90 x 96 feet, to cost $40,000, including a machine shop. F. C. Klawiter, 2077 Fairmount avenue, St. Paul, is architect.

GLENWOOD, MINN.—City council has plans maturing for new municipal electric light and power plant, to cost about $150,000. Financing will be carried through by federal aid. Burlingame & Hitchcock, Sexton building, Minneapolis, consulting engineers.

MINNEAPOLIS—H. D. Hudson Mfg. Co., 324 Third avenue, North, manufacturer of poultry equipment, sheet metal specialties, ventilators and other metal equipment, reports that the average increase in sales in all departments will run 30 per cent ahead of 1933. Due to the increase in business, the payrolls of the company have risen 150 per cent since last summer.

ST. PAUL—Kaplan Paper Box Co., George Kaplan, president and manager, has awarded contract for construction of a 1-story factory addition, 24 x 100 feet.

South Dakota

DEADWOOD, S. DAK.—Canyon Corp., Mitchell Teradash, president, has awarded contract for construction of an ore mill at Maintland mine west of Deadwood. C. Q. Schlereth, Denver, is consulting engineer.

WILLOW LAKE, S. DAK.—City plans construction of a municipal waterworks and sewer system to cost $50,000, including a 50,000-gallon steel tank on a 100-foot steel tower, about 4 miles of watermains, pump house and turbine pump. Dakota Engineering Co., Western building, Mitchell, S. Dak., engineer.

Iowa

IOWA CITY, IOWA—Iowa City Light & Power Co. has started work on con-

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This spring may fail before reaching one hundred thousand compressions.

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Here

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necting city gas mains to natural gas pipeline, to cost $50,000.

OSKALOOSA, IOWA — Woodrow Washer Co., Charles Eveland, president, has awarded contract for construction of a factory for the manufacture of washing machines.

Nebraska

OMAHA, NEBR.—Ferer Galvanizing Corp. will soon start construction of a galvanizing plant at Eighth and Douglas street, to cost $30,000.

Pacific Coast

ALAMEDA, CALIF.—A loading dock and two large cranes of the joint plant of the McClintic-Marshall Corp. and the Bethlehem Shipbuilding Corp. recently were damaged by fire.

ARCADIA, CALIF.—Steuben Brewing Corp., 682 South Vermont avenue, Los Angeles, plans construction of a 1-story steam power plant at proposed multi-story brewery on a 10-acre site. Electric power equipment will be installed for general brewery service. Entire project is estimated at $100,000. George W. Harding is company engineer.

BURBANK, CALIF.—Fire of undetermined origin swept over the set of the Warner Bros.-First National studio last week, causing damage to shops and outdoor sets, including the machine shop.

MODESTO, CALIF.—Ernest Green, Sycamore avenue, has contract from the city of Modesto for construction of a 1-story machine shop. Cost is estimated at $9850.

LOS ANGELES—Los Angeles board of education has approved preliminary plans for rehabilitation of shop building at La Fayette junior high school, 1515 East Fourteenth street. Cost is estimated at $24,529.

LOS ANGELES—General Aviation Corp., 100 East Tenth street, Wilmington, Del., subsidiary of General Motors Corp., is planning to erect a large manufacturing plant here. Total cost of factory and site is estimated at about $1,000,000.

SAN FRANCISCO—Northern California Hardware & Steel Co., 140 Howard street, has recently been organized by Carl Claussen.

CENTRALIA, WASH. — Western Malting Co., recently incorporated, is remodeling two buildings and installing equipment. Operations will probably begin in January.

Windows of Washington

(*Concluded from Page 20*)

maker win the largest order for steel piling ever placed by the government —or for that matter, so far as is known by any buyer. The piling is for the first section of the Grand Coulee dam in the Pacific Northwest, and will cost the government $1,180,401.40.

None of the bidders taking advantage of the President's executive order permitting the code price to be shaved up to 15 per cent, identical tenders resulted. The feeling among representatives of these companies was that the business should be split, which would have given each upward of 4000 tons—in itself no mean order for piling.

But a ruling by Controller General McCarl, dated Aug. 4, evidently predicated upon fear of collusion, prohibits a division of government business. Either a way must be found to base a claim that one maker's product is superior to others, or lots must be drawn. Piling is piling, the bureau of reclamation decided, and Inland was lucky.

ONE hundred and seventy million dollars is small potatoes these days when no respectable federal project ever falls below a billion, and so the interstate commerce commission hearing on the petition of the railroads for increased freight rates is dragging into its third and final week. Arguments will be heard beginning Jan. 9.

The testimony of shippers, who are now being heard, is identical save for minor variations in verbiage; shippers simply don't want to pay out $170,000,000 additional a year in freight charges.

Incidentally, to say that shippers are being "heard" is flattering. Because the old ICC building on Pennsylvania avenue was so noisy, architects of the new ICC $5,000,000 home on Constitution avenue went to great pains to exclude outside interruption. They were successful in this, but at the same time apparently ignored the matter of acoustics, so that the new hearing room is worse than the old.

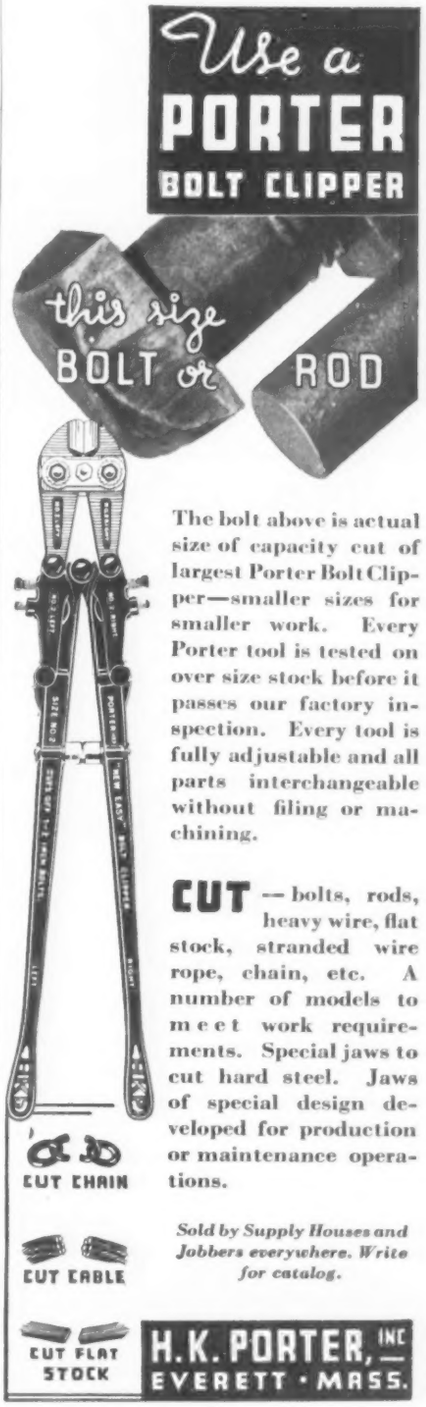
AWAIT UNIFIED CONTROL PLAN

It will be sometime in 1935 before a decision is handed down. Under normal conditions, the carriers would have an airtight case, what with NRA raising the cost of supplies and wage reductions to railroad labor rescinded at the behest of the White House. But with Co-ordinator Eastman developing plans for a unified control of all forms of transportation, the ICC may suggest that the railroads wait.

Among other offsets of higher freight revenues is the national freight car pool which Co-ordinator Eastman has visualized for many months and which was again proposed last week. In effect, the 2,200,000 freight cars owned by the railroads, and by inference the 280,000 cars owned privately, including those by the iron and steel industry, would be lumped in one vast pool, and this equipment rented on a per diem basis.

The chief economy thus sought is a reduction in the empty car mileage. In 1920 this was 32 per cent of the total mileage of the railroads; by 1932 it had increased to 39 per cent. Ninety per cent of all coal cars return empty—a condition which even a pool probably could not remedy. Were the railroads to save 2 cents a mile in handling what is considered excessive empty mileage the annual total would be $50,000,000. As much more can be made, it is claimed, by reductions in repairs and in charges on surplus equipment.

Such a tool apparently would put an end to privately-owned equipment. Anyway, Washington has a complex on this type of equipment, as evidenced by the recent edict against advertising on the sides of such cars. One authority estimates that 200,000 cars expire annually through obsolescence and the ravages of time and handling. In 11 months of 1934 the railroads have ordered 23,719 cars from private builders.



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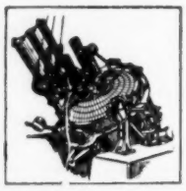

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STATISTICS OF IRON AND STEEL INDUSTRY

From dept. of commerce except shipments by U. S. Steel Corp., foundry equipment by Foundry Equip. Mfrs. association, river traffic by U. S. engineers at Pittsburgh, electric power by geological survey.

U. S. Steel Corp.

Automobiles

Units Production —United States—

1933	Total*	Passenger cars	Canada
Jan.	129,478	110,180	3,358
Feb.	105,933	90,425	3,298
March	115,985	97,782	6,632
April	177,059	150,515	8,255
May	214,832	181,927	9,396
June	250,290	209,083	7,323
July	230,140	192,894	6,540
Aug.	233,825	193,111	6,079
Sept.	192,613	158,678	5,808
Oct.	134,956	105,685	3,682
Nov.	61,031	41,066	2,291
Dec.	81,114	50,621	3,262
Year	1,927,256	1,581,967	65,924
1934			
Jan.	156,907	113,331	6,904
Feb.	231,707	187,639	8,571
Mar.	331,263	274,722	14,180
Apr.	354,745	289,030	18,363
May	331,652	273,765	20,161
June	308,065	261,852	13,905
July	266,576	223,868	11,114
August	234,809	183,500	9,904
Sept.	168,872	123,909	5,579
Oct.	132,488	84,503	3,780
10 Mo.	2,517,084	2,016,119	112,461

*Difference of total and passenger cars equals number of trucks. †Average monthly shipments, 1922-23-24 taken as 100
‡Figures by American Institute of Steel Construction, from January, 1933, 75 to 85 per cent of industry reporting.

Shipments

To consumers only, inter-company shipments not included

1933	Tons
Jan.	285,138
Feb.	275,929
March	256,793
April	335,321
May	455,302
June	603,937
July	701,322
Aug.	668,155
Sept.	575,161
Oct.	572,897
Nov.	430,358
Dec.	600,639
Year	5,805,235
1934	
Jan.	331,777
Feb.	385,500
Mar.	588,209
Apr.	643,009
May	745,063
June	985,337
July	369,938
August	378,023
Sept.	370,306
Oct.	343,962
10 Mo.	5,141,124

Fabricated Shapes‡

Net Tons

1933	Bookings Tonnage	Shipments Tonnage
Jan.	73,679	50,965
Feb.	50,955	46,168
March	71,398	54,948
April	46,095	50,387
May	42,600	63,968
June	81,910	64,809
July	56,482	51,303
Aug.	78,379	67,913
Sept.	57,642	64,362
Oct.	53,695	73,139
Nov.	60,896	56,023
Dec.	83,799	56,388
Year	757,530	700,373
1934		
Jan.	74,358	46,774
Feb.	60,036	38,101
Mar.	82,250	50,685
Apr.	98,383	66,782
May	62,391	82,735
June	97,390	81,877
July	57,234	80,326
August	73,559	95,864
Sept.	48,701	80,869
Oct.	50,070	94,215
10 Mo.	704,372	718,228

Fabricated Plates

1933	Total	Net Tons Bookings Oil Storage Tanks	Miscellaneous
Jan.	11,128	1,501	8,830
Feb.	16,588	8,347	7,660
March	8,903	1,270	6,787
April	9,502	2,938	6,291
May	16,243	2,858	8,183
June	37,020	20,894	14,013
July	20,058	6,013	11,417
Aug.	16,320	2,581	10,618
Sept.	16,025	1,033	13,602
Oct.	17,839	1,434	12,162
Nov.	14,466	3,734	9,466
Dec.	13,692	2,160	9,819
Year	199,031	55,025	119,569
1934			
Jan.	15,897	3,754	10,512
Feb.	14,641	2,476	10,452
Mar.	38,924	2,202	33,806
Apr.	20,085	2,998	13,447
May	21,891	8,746	10,802
June	27,395	11,019	13,642
July	12,523	2,028	7,901
August	16,293	3,334	10,855
Sept.	15,108	3,445	8,218
Oct.	15,452	927	11,437
10 Mo.	198,209	40,929	131,072

Foundry Equipment Order Index†

1933	
Jan.	68.4
Feb.	16.1
March	9.8
April	19.4
May	25.7
June	45.5
July	48.6
Aug.	56.2
Sept.	34.9
Oct.	42.46
Nov.	36.62
Dec.	43.2
Year	.....
1934	
Jan.	37.2
Feb.	65.8
Mar.	75.4
Apr.	67.8
May	66.3
June	70.4
July	50.7
August	43.1
Sept.	46.4
Oct.	55.3
10 Mo.	....

Malleable Castings

Net Tons

1933	Output	Shipments	Orders booked
Jan.	12,577	14,248	12,404
Feb.	13,575	14,068	11,077
March	9,756	10,967	12,380
April	17,871	16,666	17,856
May	24,628	23,077	24,671
June	31,118	29,268	31,997
July	30,865	29,155	28,458
August	31,811	30,195	28,323
Sept.	27,078	25,402	22,744
Oct.	24,381	20,422	19,933
Nov.	21,903	19,722	20,776
Dec.	21,870	22,300	26,305
Year	268,617	256,419	258,082
1934			
Jan.	30,417	26,642	32,501
Feb.	33,939	31,412	36,594
March	43,438	41,530	42,961
April	40,742	39,817	38,453
May	37,165	39,493	32,639
June	28,340	31,607	24,499
July	23,388	27,591	21,862
August	23,910	25,784	21,306
Sept.	21,541	20,360	19,511
Oct.	25,317	21,683	18,785
10 Mo.	308,197	305,919	289,111

Steel Castings

Net Tons

1933	Total bookings	Total production
Jan.	14,450	15,378
Feb.	13,179	13,802
March	13,178	14,896
April	15,942	13,492
May	22,612	20,751
June	34,965	29,455
July	31,878	31,718
August	31,502	33,834
Sept.	25,220	28,087
Oct.	26,135	27,826
Nov.	25,558	24,721
Dec.	25,612	23,718
Year	280,231	277,678
1934		
Jan.	26,296	27,644
Feb.	35,698	28,526
March	60,044	39,475
April	63,142	46,242
May	46,831	57,313
June	41,537	50,268
July	41,822	46,182
August	25,538	43,748
Sept.	20,030	31,816
Oct.	.....	.....
10 Mo.	.....	.....

Mech. Stokers

—Sales—

1933	Fire tube boilers	Water tube boilers
Jan.	55	13
Feb.	38	23
March	69	17
April	28	34
May	54	44
June	147	50
July	110	67
August	157	61
Sept.	175	28
Oct.	147	31
Nov.	142	40
Dec.	109	13
Year	1,231	421
1934		
Jan.	100	23
Feb.	49	25
March	62	43
April	48	39
May	110	35
June	117	52
July	121	68
August	183	49
Sept.	240	39
Oct.	229	44
10 Mo.	1,259	417

Steel Furniture

Dollars 000 omitted

1933	Business shipments	Shelving, shipments
Jan.	582	121
Feb.	464	104
March	482	137
April	404	133
May	511	166
June	636	165
July	522	156
August	693	178
Sept.	734	163
Oct.	825	146
Nov.	799	195
Dec.	1,040	202
Year	7,697	1,870
1934		
Jan.	996	214
Feb.	894	279
March	955	394
April	934	346
May	1,010	288
June	1,045	354
July	863	230
August	1,101	225
Sept.	879	260
Oct.	997	223
10 Mo.	9,678	2,819

Babbitt Metal

Pounds 000 omitted

1933	(a) Total production	(b) Sales
Jan.	1,346	1,073
Feb.	1,117	917
March	1,134	941
April	1,544	1,270
May	2,110	1,785
June	2,327	1,877
July	2,484	1,941
August	2,753	2,059
Sept.	2,419	1,803
Oct.	2,090	1,554
Nov.	1,963	1,606
Dec.	1,459	1,043
Year	22,812	17,876
1934		
Jan.	2,256	1,838
Feb.	2,147	1,715
March	2,474	1,976
April	2,527	1,964
May	2,425	1,889
June	2,261	1,618
July	1,988	1,435
August	1,856	1,399
Sept.	1,653	1,273
Oct.	1,807	1,364
10 Mo.	21,398	16,475

(a) by 40 plants. (b) by 30 manufacturers who produce for sale, including 5 who also report consumption of own metal.

Coke

Net Tons Production

1933	By-Product	Beehive
Jan.	1,784,527	81,900
Feb.	1,638,817	84,100
March	1,666,035	93,300
April	1,656,183	47,000
May	1,921,257	47,300
June	2,241,432	50,100
July	2,797,316	68,400
August	2,923,418	70,600
Sept.	2,712,050	59,500
Oct.	2,581,834	45,000
Nov.	2,334,597	92,800
Dec.	2,454,947	89,500
Year	26,722,400	829,500
1934		
Jan.	2,475,785	107,900
Feb.	2,493,494	129,100
March	2,968,573	161,400
April	2,875,451	71,600
May	3,191,869	63,200
June	2,989,875	61,100
July	2,381,459	50,700
August	2,279,672	43,700
Sept.	2,174,771	54,800
Oct.	2,316,858	75,800
10 Mo.	26,147,807	819,400

Electric Power

Millions Kilowatt Hours Production*

1933	
Jan.	6,932
Feb.	6,285
March	6,674
April	6,462
May	6,996
June	6,231
July	7,479
August	7,686
Sept.	7,347
Oct.	7,478
Nov.	7,243
Dec.	7,447
Year	85,260
1934	
Jan.	7,631
Feb.	7,049
March	7,717
April	7,443
May	7,683
June	7,472
July	7,605
August	7,710
Sept.	7,199
Oct.	7,815
10 Mo.	75,324

*For public use.

Steel Barrels

Units

1933	Production	Shipments
Jan.	341,382	341,055
Feb.	311,111	312,919
March	427,562	425,682
April	452,086	454,794
May	531,304	531,921
June	643,982	640,596
July	623,056	621,042
August	537,801	527,811
Sept.	580,471	585,842
Oct.	873,536	863,277
Nov.	638,850	644,954
Dec.	610,440	610,365
Year	6,571,581	6,560,258
1934		
Jan.	708,086	706,209
Feb.	573,391	572,915
March	695,681	703,101
April	657,185	658,216
May	494,051	489,186
June	701,826	696,349
July	598,745	608,644
August	361,852	364,081
Sept.	412,592	417,114
Oct.	583,255	575,281
10 Mo.	5,786,742	5,791,234

River Traffic

Net Tons

1933	Allegheny	Monongahela	Ohio
Jan.	1,627	11,724	18,002
Feb.	1,656	17,904	23,614
March	425	19,546	32,917
April	3,025	35,795	37,191
May	4,400	39,890	46,038
June	815	58,179	56,484
July	3,900	68,453	62,096
August	3,234	67,389	69,531
Sept.	2,000	43,026	38,480
Oct.	4,240	39,026	49,047
Nov.	1,550	28,216	39,573
Dec.	4,130	38,693	31,038
Year	31,007	467,841	509,011
1934			
Jan.	590	27,158	54,109
Feb.	520	12,429	4,373
March	2,180	40,685	47,897
April	5,100	51,995	72,974
May	3,050	72,922	73,361
June	10,195	54,913	83,718
July	2,950	41,231	60,005
August	2,015	32,412	45,840
Sept.	3,750	35,411	45,848
Oct.	3,400	43,347	46,475
10 Mo.	33,750	412,503	534,600

Steel Boilers

1933	Total	Units Stationary	Marine
Jan.	197	189	8
Feb.	176	162	14
March	195	186	9
April	236	228	8
May	328	307	21
June	511	496	15
July	498	491	7
August	511	441	70
Sept.	447	442	5
Oct.	395	377	18
Nov.	296	291	5
Dec.	328	310	18
Year	4,118	3,920	198
1934			
Jan.	249	239	10
Feb.	212	198	14
March	294	283	11
April	380	361	19
May	304	294	10
June	415	402	13
July	455	452	6
August	597	584	13
Sept.	626	594	32
Oct.	696	677	19
10 Mo.	4,231	4,084	147

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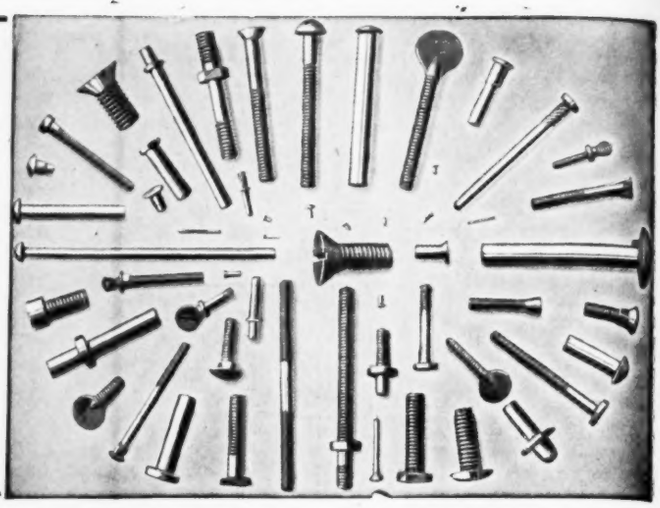

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